BUSINESS CYCLES IN SELECTED INDUSTRIAL AREAS

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By

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and

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PREFACE

THIS STUDY *represents one element in a broad program of regional research being undertaken by the staff of the Haynes Foundation. As a group, the studies in economics represent only one aspect of this program. It is hoped that economic research, combined with political and sociological studies, will ultimately provide some understanding of the fundamental forces affecting life in urban areas and a basis for the formulation of sound public policy.*

Small areas within the nation differ from one another and from the nation as a whole. Their unique characteristics display extraordinary range. Life in any area represents response not only to these regional peculiarities, but to the force of those of nearby and of more distant localities as well as to those of larger areas of which it is a part. Areas seldom respond uniformly to the same forces and precisely the same forces seldom exert themselves against two or more areas at once. Complete understanding of all forces affecting even a single urban area requires more knowledge than any individual or group is likely to have, and full knowledge of the general principles of urban society seems even more remote. Nevertheless, the aim of the Haynes Foundation is to penetrate into this body of principles, and each regional study undertaken by it represents some contribution to this objective.

This investigation has been preceded by two earlier economic studies, An Economic Survey of the Los Angeles Area *and* Production Cost Trends in Selected Industrial Areas. *This volume represents an attempt to answer certain questions raised in the two earlier works. As the reader will discover, the present study raises many questions that are left unanswered, but, it is hoped that some contribution is made to knowledge of the way in which business cycles reflect themselves in large industrial areas and of the causes of differential cyclical pattern.*

Heretofore statistical studies of business cycles have been largely confined to the study of national fluctuations with only occasional reference to fluctuations in smaller areas. Most economic studies of a quantitative nature have used the nation as the frame of reference, and data have referred to the nation as a whole. Only in research in international economics has the problem of interarea differences been met; unfortunately the lessons learned in the study of this field have not often been applied to regions or areas lying within a single sovereign state. This investigation is confined wholly to this unexploited field of economic research.

Of necessity a part of this study is concerned primarily with statistical technique, and particularly with the problem of time series decomposition. As far as possible, this material has been restricted to chapter ii. Readers who are not concerned with the problem of methodology and who are interested principally in the results may, therefore, skip this chapter. The economist

cannot do so, however, for knowledge of the method employed is, at times, basic to the interpretation of materials presented elsewhere.

Many persons have contributed to this study, and the authors are heavily indebted to them for assistance in the planning and execution of the work. The research would never have been undertaken had it not been for the interest and attention, at the planning stage, of Miss Anne M. Mumford, Dr. Gordon S. Watkins, and Mr. E. F. Scattergood, Trustees of the Haynes Foundation. Both Miss Mumford and Dr. Watkins have read and criticized the entire manuscript, and Mr. Scattergood, until his death, was a constant source of stimulation.

Two members of the Haynes Foundation staff, Mr. Richard E. Speagle and Mrs. Gloria S. Goldberg, contributed so much to this study that they might well be considered co-authors. Mr. Speagle assisted greatly in the early stages of planning the work and in the preliminary statistical phases, and Mrs. Goldberg, in the writing of the report. Additional invaluable assistance was provided by Mr. Robert Williams and Dr. Armen Alchian of the University of California, Mrs. G. N. Conly of Pomona College, and Mr. J. A. Stockfisch, all of whom read and criticized the manuscript in first draft, by Miss Phyllis DiBenedetto who made numerous editorial suggestions, and by Mr. Paul T. Silvius who prepared all the charts.

The authors owe a special debt of gratitude to Dr. A. F. Burns of the National Bureau of Economic Research, to Dr. Rutledge Vining of the University of Virginia, and to Dr. Robert D. Calkins of the General Education Board. All read and criticized the manuscript and, as a result of their suggestions, the study is far better than it otherwise would be.

In spite of efforts to resolve all differences between the authors and co-workers with respect to technique and interpretation, some differences still remain. The senior author must be held responsible for making decisions at these points and, as well, for any errors that may be found in the work. Of course, none of those who read and criticized the manuscript can in any way be held answerable for its shortcomings.

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CHAPTER I

REGIONAL AND NATIONAL BUSINESS FLUCTUATIONS

PHENOMENA today referred to as business cycles in both popular and scientific works are neither precisely, nor even generally, defined. Rather, it is customary to assume that there is a consensus with respect to the meaning of business cycles and to proceed directly either to an "explanation" of causal sequence or to a summary and restatement of a number of causal hypotheses. Perhaps the principal reason for this remarkable absence of exact definition is the difficulty encountered in constructing a definition that is sufficiently inclusive and, yet, which does not itself give rise to further, almost insurmountable, problems of interpretation. Most writers prefer to let the historical material and causal process presented serve the purpose, making their volumes both studies of the cyclical process and definitions of "the business cycle." The complexity of the business process certainly provides ample justification for such a course.

THE BUSINESS CYCLE: A DEFINITION

W. C. Mitchell, in his book *Business Cycles: The Problem and Its Setting*,[1] reached the last chapter before offering a definition. In a much later volume, Burns and Mitchell observed that this definition "is thus a tool of research, similar to many definitions used by observational sciences, and like its analogues is subject to revision or abandonment if not borne out by observation."[2] Perhaps the present study will provide a basis for some revision, but, in any event, Mitchell's definition with minor modification is used as a point of departure and as a "tool of research" in the present investigation:

> Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitudes approximating their own.[3]

An important element within this definition is that cycles are found where work is organized mainly in business enterprises; this element itself

[1] W. C. Mitchell, *Business Cycles: The Problem and Its Setting* (New York, National Bureau of Economic Research, 1927).
[2] A. F. Burns and W. C. Mitchell, *Measuring Business Cycles* (New York, National Bureau of Economic Research, 1946), p. 3.
[3] Burns and Mitchell, *loc. cit.*

gives rise to some very important problems. Sometimes an economy where work is thus organized is described as a "money economy"; in fact, some students feel that widespread use of money is essential to the explanation of cycles. Elsewhere, this idea is buried in the term "capital" or "capitalism," and cyclical variation is identified as emerging only with the capitalistic system. Again, "profit system" is used to designate the institutional framework within which cycles appear. Mitchell, in his earlier work, chose the term "business economy" and described it as a community in which most "economic activities take the form of making and spending money."[4] It is clear, however, that specialization of function and the exchange of goods and services are the essential characteristics of a "business economy," and not money as such; money is merely the tool.

Business Cycles and Urbanization

The history of cycles indicates that they become a recurrent feature of society only as a high degree of specialization and exchange develops, and only as the necessarily associated money economy becomes widespread. Hence, they did not appear in feudal society, regardless of interregional trade and manorial specialization, nor did they appear even in the economics of medieval cities. Not until the beginning of the nineteenth century did cycles fitting Mitchell's definition appear. Contrarily, the growth of modern cities is of extreme importance, since one important aspect of their development was the coincident rise of the business economy. Modern cities developed par excellence the specialization and exchange process which is the heart of the business economy. Indeed, it was in the cities that this process developed most rapidly and continues to do so today, and only in rural areas do subsistence operations exist.

Mitchell reports that "business cycles are primarily phenomena of large-scale enterprise"[5] and indicates that the data from which this conclusion is drawn suggest that the employment decline following the crisis is greatest for manufacturing, railroading, construction and mining, and least for agriculture and retailing.[6] If cycles appear most clearly in fields dominated by large-scale operations, they therefore appear in typically urban businesses rather than in rural farming activities where the scale is generally small. In 1935, out of seven million farm units, less than 42,000 employed more than five people each, but the small units em-

[4] Mitchell, *op. cit.*, p. 63. Not all students restrict in this manner the historical study of cycles. See, for example, J. A. Schumpeter, *Business Cycles* (New York, 1939), p. 225.

[5] Mitchell, *op. cit.*, p. 87.

[6] This conclusion was drawn by Mitchell from W. I. King, *Employment, Hours, and Earnings in Prosperity and Depression: United States, 1920–1922* (New York, National Bureau of Economic Research, 1923).

ployed 97 per cent of all agricultural wage earners.[7] On the other hand, the seventy-five largest manufacturing corporations controlled 40.2 per cent of total manufacturing corporate assets, whereas the forty largest public utility corporations controlled 80.4 per cent of total utility assets.[8] These are typically urban businesses and, even though it is true that services, retail trade, and construction are generally small yet also largely urban, still the preponderance of large business enterprise is to be found in, or adjacent to, urban areas.

Another recent indication of instability of urban, as opposed to rural, business is the fact that relative price stability, usually appearing in fields dominated by large-scale business, is almost invariably associated with output instability; and relative price flexibility and competitive markets, for example, agriculture, are associated with stable output.[9] Thus, cities exemplifying both functional specialization and large-scale, cyclically vulnerable business may well be expected to be inextricably involved in exaggerated cyclical swings.

The Rate of Urbanization

Continuing urbanization of the population has been one of the fundamental changes that has occurred in the United States in the last century. Rural population declined from 65 per cent of the total population in 1890 to 43.5 per cent in 1940, while 40.1 per cent in the latter year lived in cities in excess of 25,000 population.[10] More significant even than this is the fact that the percentage of the total population living in the thirty-three industrial areas tabulated by the United States Census increased from 25 per cent in 1890 to 44 per cent in 1940, whereas the population density in these areas more than tripled, increasing from an average of 315 persons per square mile in 1890 to 1,143 in 1940. Table 1 presents additional data indicating the relative growth in population of the thirty-three industrial areas and of the six particular areas subject to more comprehensive study below.

At the same time that population distribution was shifting in favor of urban centers, and especially in favor of industrial areas, the relative

[7] National Resources Committee, *The Structure of the American Economy, Part I: Basic Characteristics* (Washington, 1939), p. 103.

[8] Temporary National Economic Committee, *Bureaucracy and Trusteeship in Large Corporations* (Washington, 1940), Monograph No. 11, p. 5.

[9] National Resources Committee, *op. cit.*, pp. 147–148. See also F. C. Mills, *Price-Quantity Interactions in Business Cycles* (New York, National Bureau of Economic Research, 1946), p. 54. Mills holds that durable goods have the highest quantity and least price elasticity in business cycles of seventeen classifications of goods, whereas American farm products have third from lowest quantity elasticity and crop products, domestic, second lowest. See also "The United States Steel Corporation: II," *Fortune*, April, 1936, p. 132.

[10] United States Bureau of the Census, *Sixteenth Census of the United States, 1940: Population*, Vol. I, pp. 18, 25.

significance of these areas as manufacturing centers did not grow so rapidly; in fact, the thirty-three industrial areas taken as a group did not grow so rapidly as did the United States.[11] An index of value added by manufacture in the United States increased from a base of 100 in 1899 to 515.4 in 1939, whereas a similar index for the thirty-three areas reached a somewhat lower figure, 509.1. Though the difference is small, and might be only a reflection of inexactness in the census data, the areas at least did not grow more rapidly than the nation. As a consequence of this lesser rate of growth, the percentage of total value added by manufacture accounted for by the areas declined slightly, from 61.5 to 60.8.

TABLE 1

PERCENTAGE OF TOTAL UNITED STATES POPULATION IN THE THIRTY-THREE INDUSTRIAL AREAS AND IN THE SIX INDUSTRIAL AREAS, 1870–1940

	1870	1880	1890	1900	1910	1920	1930	1940
Thirty-three areas	22.8	23.4	25.5	27.6	30.3	33.0	35.9	44.2
Six areas	3.6	4.2	5.3	6.3	7.4	9.0	11.1	11.2
Los Angeles	....	0.1	0.2	0.2	0.6	0.9	1.8	2.1
San Francisco	0.5	0.7	0.7	0.7	0.8	0.9	1.1	1.1
Chicago	1.2	1.5	2.2	2.8	3.0	3.3	3.8	3.7
Detroit	0.4	0.4	0.5	0.5	0.6	1.2	1.7	1.7
Cleveland	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.0
Pittsburgh	1.0	1.1	1.3	1.4	1.6	1.7	1.7	1.6

SOURCE: G. E. McLaughlin, *Growth of American Manufacturing Areas* (Pittsburgh, 1938), pp. 51–55, and *United States Census of Population*, 1938, Vol. I.

The six urban areas studied here are Los Angeles, San Francisco, Chicago, Detroit, Cleveland, and Pittsburgh. They were chosen because they embody several characteristics important in various of the thirty-three census areas. They have been selected partly as representative of different rates of manufacturing growth. Los Angeles, Detroit, and San Francisco displayed rapid rates of growth; Cleveland and Chicago showed somewhat lower rates; and Pittsburgh, the lowest of the six. These areas also represent various rates of population growth. Taken together, however, they are unlike the others in manufacturing development. The index of value added by manufacture for the six areas studied increased from 100 in 1899 to 761.1 in 1939, so that their proportion of total value added increased from 14.2 to 21.0 per cent.[12] In view of this, plus the fact that the productivity of labor in manufacturing increased

[11] For an interesting discussion of the economic pattern of cities, and trends in their patterns, see C. Clark, "The Economic Functions of a City in Relation to Its Size," *Econometrica*, Vol. 13, No. 2 (April, 1945), pp. 97–113.

[12] Derived from G. E. McLaughlin, *Growth of American Manufacturing Areas* (Pittsburgh, 1938), p. 158, and *United States Census of Manufactures*.

spectacularly over the same period (more than two and a half times),[13] it appears that specialization of function was increasing both in the United States as a whole and in specific areas. Concurrently, population expanded both nationally and in urban areas. These changes steadily added to the significance of the cyclically vulnerable segments of the American economy.

Regional Cycles Study: Purpose and Justification

Business cycles, therefore, are characteristic of cities, of urban masses where both concentration of people and concentration of large-scale industrial operations require a high degree of specialization. Thus, in modern society, major urban centers are destabilizing areas. This does not mean that cyclical swings are limited geographically to cities. On the contrary, they are economy wide, but cities are focal points and might well be termed "strategic" areas. Variations in business activity are "contagious"; they are transmitted between business firms and industries by the complex relationships existing between them and between areas by all of the economic ties that link one region to another. All interregional economic relationships are the "carriers" of cyclical fluctuations. The more dependent regions become upon one another, the more significant these "carriers" become. Hence, the movement of people, of goods and services, and of liquid assets are important factors in the analysis of regional business cycles.[14]

If certain regions assume strategic positions as destabilizing sectors in an economy, they merit special study; their vulnerability may permit a reasonable forecast of general business conditions, and they present a possible opportunity for the application of policy designed to bring about some measure of stability that hitherto has not been fully explored.

Other, and perhaps more pressing, reasons exist for the study of regional or industrial area cycles as opposed to the study of national cycles. In small areas, the timing, duration, or amplitude may be substantially different from that characteristic of larger areas. Indeed, Professor Allyn Young remarked that "geography has something to say on the negative side of the question of the significance of the notion of a 'typical' cycle."[15] Burns and Mitchell raise, but leave unanswered, the question in connec-

[13] Cf. Solomon Fabricant, *Labor Savings in American Industry, 1899–1939* (New York, National Bureau of Economic Research, 1945), Occasional Paper 23, p. 11, and App. table iii.

[14] For a rather detailed and analogous discussion of regional cycles, see G. Haberler, *Prosperity and Depression* (Geneva, 1938), chap. 11. This discussion runs in terms of the international transmission of cyclical variation, but Haberler says (p. 304) that these factors "operate, not only between countries separated by political borders, but also within political areas between different regions."

[15] A. A. Young, *An Analysis of Bank Statistics for the United States* (Cambridge, 1928), p. 42.

tion with their definition of a cycle, of whether "the several geographic regions have substantially different cyclical movements."[16] What is even more important than either the presence or absence of significant differences in cyclical pattern at any given time between areas is the probability that, over time, changes in the differences are occurring and that these changes are related to factors which are subject to some measure of control. Thus, for example, the Los Angeles area may be developing in such a way that it will become more like the other areas in pattern or, on the contrary, it may be moving in an opposite direction. Knowledge of either change might lead to policies designed to limit, offset, or modify such development.

The study of cyclical differentials, or of regularity in their change, may be of greatest value to business forecasters. The discovery of leads or lags between regions which are of regular character would permit forecasts of business conditions which are far more reliable than are now possible. *Business Week*, in its report on the Far West market (April 12, 1947), indicates that history supports the belief that western cycles lag behind eastern ones by six months.[17] Most frequently, the reference is to "business cycles" as such, but often, and more cautiously, the reference is to a lag of western business behind a certain industry or group of industries which concentrate geographically in the East. In either event, by the study of current eastern conditions, westerners could predict what local conditions would prevail some months hence. Whether that knowledge would intensify or attenuate local cycles is open to question, but such forecasts would be possible.

Finally, a rather practical reason for the intensive study of regional cycles is the fact that empirical economic research characteristically has been oriented either toward the national economy, as such, or toward single industries or firms. The whole field of regional economic studies has been neglected. National studies of great significance have been completed by such institutions as the National Bureau of Economic Research, the Brookings Institution, the Committee for Economic Development, and many federal agencies. But with the notable exception of certain investigations by the National Resources Planning Board and its predecessor, the National Resources Committee, Frank L. Kidner's *California Business Cycles* (Berkeley, 1946), and the several contributions of Rutledge Vining to be found in *Econometrica* (July, 1945, and subsequent

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[16] Burns and Mitchell, *op. cit.*, p. 5.

[17] See also J. H. Cover, "The Significance of Regional Business Analysis," *Journal of the American Statistical Association, Supplement*, March, 1929, p. 153. Cover suggests that the Pacific Coast lags by approximately three months. Vining, however, suggests grounds for questioning the matter of western lag. See R. Vining, "Regional Variation in Cyclical Fluctuation Viewed as a Frequency Distribution," *Econometrica*, Vol. XIII (1945), p. 208.

issues), regional studies have been limited to a few masters' and doctoral dissertations that, for the most part, are unavailable to the majority of students. National studies represent the examination of either aggregates or averages, and a wealth of factual detail is lost thereby.

Working within the limits established by the definition, the objectives of this study are: first, to discover similarities or differences in the timing, duration, and pattern of business cycles in the six selected industrial areas; second, wherever possible, to identify causes for divergent cyclical reaction.

Ideal Data for Regional Studies

In any statistical study of business cycles, a major compromise must be made at the outset; ideal data for such investigations do not exist, and the data most readily available are often inadequate for satisfactory solution of the problem. In addition, there is no consensus on what constitutes ideal data for the study of cycles. The answer depends largely upon the specific purposes of the research. The purposes of this particular investigation are, briefly, to compare the cycles in the several areas and, where it is possible, to determine the causes for similarity or difference. With such ambitious purposes as these, the compromise between the ideal data and those utilized is great, though by no means fatal.

Fluctuations in the level and in the distribution of current income payments among individuals are probably the most important aspect of cyclical change from a social point of view. These fluctuations reflect changes both in employment and in the differential rates at which the various distributive shares of total income change. Coincident with alterations of income are other disturbances in the economic system. Output is changed, price relationships are disturbed, and investment processes are altered. No business data are completely insensitive to cycles, yet many phenomena, not strictly economic, but more properly social, are likewise measurably affected. By July, 1942, the National Bureau of Economic Research had analyzed 972 series referring specifically to the United States and an additional 305 series relating to cycles in Great Britain, Germany, and France. The processing of such a mass of material, even if it were available on a regional basis, would be prohibitive in expense, though undoubtedly the study of each series contributes something to our knowledge of cycles. Restricting the data to the most significant series, and mindful of the necessary relationship between the ideal data and the specific purposes of this research, the following regional series might well be chosen, if available.

a) Income, by distributive share and by income bracket.
b) Employment, by occupation and by industry.
c) Income disposition, consumption by item, and saving.

d) Investment and disinvestment by industry and by type.
e) Output, both physical and value, by industry.
f) Prices, by product.
g) Speculative activity, by type.
h) Imports and exports, by product or service.

This list, however subject to objection it may be, indicates at once the magnitude of the compromise that must be made. Few of these items are available at all. For the nation as a whole, some of the series are unobtainable or fragmentary, and the data on hand for small geographic areas, and even for important industrial areas, are seriously limited when compared with the information relating to the nation as a whole; nevertheless, series are available which provide, indirectly, many of the data most useful to the study of regional cycles.

Available Data for Regional Studies

This study uses as basic data four series different from any four appearing in the list. These four series are bank debits, department store sales, industrial and commercial power sales, and industrial employment.

Bank debits represent debits at reporting commercial banks, member and nonmember, to deposit accounts of individuals, partnerships, corporations, the United States government, and state and local governments. They include debits to time or savings accounts, payments from trust funds on deposit, and the payment of certificates of deposit.[18] These data are collected monthly by the Federal Reserve Bank of the district of which the industrial area is a part, and do not necessarily refer to the area as strictly defined by the census or to the major city therein. Even if the debits were reported only by banks lying within the census-defined industrial area, they would not reflect deposit activity generated wholly within the area, since ownership of deposits is not restricted geographically. Nonetheless, the debit series reflect clearly the activity of deposits, since the major banks in the trading area report, and since most businesses within the area maintain deposits therein.

Unanimity of opinion does not exist on the extent to which bank debits measure or reflect the "volume of business." In 1934, M. M. Drake reported that "bank debits to individual accounts are not dependable barometers" because they involve duplication (any item may be purchased more than once) and because they reflect speculative activity.[19]

[18] Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, 1943), p. 231.

[19] American Statistical Association, *Proceedings of the American Statistical Association, Supplement,* Vol. 29 (March, 1934), "The Reliability of Various Statistical Series as City and Regional Business Indexes,"—"Bank Debits" by M. M. Drake. For a recent and detailed study of the meaning of bank debit series, see G. Garvey, *Debits and Clearings Statistics, Their Background and Interpretation* (Washington, 1947).

On the contrary, the Board of Governors of the Federal Reserve System reports that "changes in business activity are closely linked with changes in the volume of money payments made by check, of which bank debits provide the best available single indicator."[20] Moreover, they recognize that debits reflect duplication and transactions not associated with current production and distribution. Their conclusion is that in a broad way the data reflect business conditions by showing, among other things, changes in the attitude of the public toward holding or spending money.

It is true that bank debits are affected by a multitude of forces; prices, the physical volume of trade, the extent of speculative transactions, credit and lending operations of banks, and the degree of vertical integration in the business structure are perhaps most important. It is also true that debits increase in good times and decrease in bad. No single index or variable, nor any composite of variables, is *the* best measure of position with respect to the cycle. The fluctuations in bank debits are one aspect of the cycle. Careful use of this series permits comparison of "general" business conditions which otherwise would be difficult or impossible. The fact that debits are affected by a large number of forces makes them less subject to violent episodic changes which might occur in department store sales, for example, as a consequence of a clerks' strike. Debits, therefore, provide not only a good series for purposes of comparing business changes in various regions, but also a basis against which other less comprehensive series may be studied.

Department store sales constitute the second series utilized in this study as basic data. "Department stores are general merchandise stores with sales in excess of $100,000, usually of the full-service type, carrying men's, women's, and children's apparel and shoes, furnishings and accessories, dry goods, home wares, and many other lines. Furniture and hardware are often but not necessarily represented, although home furnishings, draperies, curtains, and linens are almost invariably represented."[21]

There sometimes are differences in the coverage of series for department store sales because of differences in the variety of merchandise carried in the several areas. Differences also arise when certain outlying districts surrounding a given large manufacturing center are included in the counting, and in other centers these districts are not included. In order to clarify the exact coverage in the six manufacturing centers, with the necessary detail of precise source, the reader should refer to appendix i, p. 197.

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[20] Board of Governors of the Federal Reserve System, *op. cit.*, p. 230.
[21] United States Bureau of the Census, *Sixteenth Census of the United States: Census of Business*, Vol. 1, Pt. 1, p. 839.

Department store sales constitute approximately 10 per cent of total retail sales in the United States and ordinarily correspond closely with total retail sales, because of the fact that department stores handle a wide variety of products.[22] However, there are some extremely important items frequently not carried by these stores such as automobiles and food, and, therefore, at certain times a department store sales series will diverge from a retail sales series. This seems to be the situation in 1933 and again in 1941.[23] Since the principal concern here is with interarea comparisons, and since distortions are likely to be of similar nature everywhere, failure to reflect retail sales accurately at all times is not a major fault. Department store sales indexes do indicate changes in consumer outlays and, therefore, are very much worth while in a study of regional business cycles, both in permitting comparison and in presenting changes in one variable that undoubtedly is an important causal factor.[24]

In using this series as a basis for the comparison between the areas, some care must be exercised, since the relative importance of this type of store, as well as the size of the individual unit, varies considerably. The following data present the per cent of total retail sales accounted for by department stores and the average sales per store in 1939 in the principal city of the several areas.[25]

City	Per cent of total retail sales	Average sales per store (000 omitted)
Los Angeles	14.4	$2,965
San Francisco	12.4	4,325
Chicago	26.8	7,006
Detroit	15.0	7,654
Cleveland	18.4	8,604
Pittsburgh	25.0	7,035

These differences seem to be a consequence of a variety of factors. Most important is that department stores in the East handle food items, whereas in the West the opposite holds true. As a result, stores handling groceries, meats, and vegetables are much more important in the West.

[22] Board of Governors of the Federal Reserve System, "Revised Index of Department Store Sales," *Federal Reserve Bulletin*, June, 1944, p. 2.

[23] *Ibid.*

[24] The significance of the study of such a series as this has been said to arise from the "behavior of groups of economic agents whose modes of action and response, in the social organization and technological environment of the society studied, are the ultimate determinants of the levels of economic variables as well as their fluctuations." Cf. T. C. Koopmans, "Measurement without Theory," *Review of Economic Statistics*, Vol. XXIX, No. 3 (August, 1947), p. 164.

[25] United States Bureau of the Census, *Sixteenth Census of the United States: Census of Business*, Vol. 1, Pt. 3.

Second, especially in Los Angeles, the relative importance of retailers in the automotive group is very great, thereby lessening the relative importance of department stores; the same appears true of eating places. Thus, differences in department store sales are a result of differences in consumption patterns and of differences in the inventories typically carried; differences owing to the former cause need not be recognized as a basis for questioning the pattern of the cycle revealed, but in the latter case it is necessary to make allowances in order that the interpretation of the cyclical pattern yielded by the series should not be erroneous.

Changes in physical output are important to business cycle analysis, since employment varies more closely with physical output than with the value of sales or of debits to bank accounts. Consequently, a reliable measure of cycles requires the examination of series that are not directly affected by prices. Defensible hypotheses with respect to causes of specific patterns demand the use of such "real" series.

It is necessary to make clear the distinction between the two types of series: bank debits and department store sales, generally speaking, are a function of the physical volume of sales of goods, services, and rights, and the prices at which these are sold; the other two series, industrial and commercial power sales and industrial employment, are relatively free from the effects of price change. The latter are free except so far as price affects physical output (kilowatt-hour sales) and employment (numbers of men).[26]

Periods of monetary inflation and rapidly rising prices may be periods of declining real output and, in extreme circumstances, of total economic paralysis. Price increases may make debits or sales series rise, even though the physical volume of output and of sales is sagging. On the other hand, prices may fall, yet output rises. In either case, the picture of the change is entirely different depending on whether physical or value series are viewed. Students of business conditions in 1925 and 1926 in the United States find commodity prices were declining at the same time that employment and output were increasing.[27]

The power series to be utilized in this investigation reflect activity in nearly all branches of business, though, unfortunately, some of the series have a broader coverage than others. These differences in coverage will be taken into account in the interpretation. For a detailed discussion of

[26] For an intensive investigation of the relationship of business cycles to electric power, see W. M. Persons and A. M. Mathews, "The Production of Electricity as an Index of the Physical Volume of Business," *Review of Economic Statistics*, Vol. X, No. 4 (November, 1928), pp. 196–201, and A. E. Patton and O. Gressens, "Influence of Business Cycles on Utility Operations," *The Journal of Land and Public Utility Economics*, Vol. II, No. 1 (January, 1926), pp. 41–47.

[27] Excellent data for the years 1925–1930 are readily available in Fabricant, *op. cit.*,

the exact make-up and coverage of the series in various areas, the reader is referred to appendix i, pp. 197–201.

Business cycles seldom fail to reflect themselves in fluctuations in employment; it is for this reason that cycles constitute what might be called the "most popular" economic problem of the times. Frequently, welfare motives lead to the treatment of employment as the result of cycles; elsewhere, employment is viewed merely as one variable among many. In this study the employment series utilized represents manufacturing employment alone. Hence, the series does not provide the coverage which might make it possible to view it as a reflection of one of the major consequences of cycles. In fact, it is probable that manufacturing employment series move differently from total employment.

Nonetheless, such a series, covering a specific determinant, provides an analytic tool. Differential changes in employment (as well as in power sales) between several areas reflecting differential movements in physical output may reveal not only variation in the cycle as measured, but also may provide the explanation for variance in the cycle as measured by other series. Narrowness of coverage may be either a virtue or a shortcoming, depending on the contemplated objectives. Appendix i provides detail on the employment series utilized in this study.

National versus Local Economic Conditions

Although it is obvious that national business conditions represent the summation of those in the several regions and areas, it is of importance to demonstrate that significant differences exist between local and national conditions before making an intensive study of the regions. Such a demonstration is especially important when the areas investigated are large; a possibility exists that they are well represented by national data.

To show clearly that the areas are not representative samples of the nation, and that there is diversity in cyclical reaction between the nation and the areas, several series have been studied. However, the techniques

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App. i through viii. These are:

	1925	1926	1927	1928	1929
Wholesale prices, BLS (1929 = 100)	108.6	104.9	100.1	101.5	100.0
Output					
Agriculture (1900 = 100)	138	141	142	144	144
Mining (1929 = 100)	83	90	92	92	100
Manufacturing (1899 = 100)	298	316	317	332	364
Electric light and power (1929 = 100)	64	74	82	90	100
Telephone communication (1929 = 100)	81	86	89	93	100
Steam railroads (1929 = 100)	97	102	98	98	100
Water transportation (1929 = 100)	84	90	93	96	100
National income, 1929 prices[a] (1929 = 100)	85	91	91	93	100

[a] Derived from S. Kuznets, *National Income and Its Composition, 1919–1938* (New York, National Bureau of Economic Research, 1941), p. 147.

of analysis are not so detailed or elaborate as those to be utilized later in the study of economic patterns of the six selected regions.

Since the areas to be studied, Los Angeles, San Francisco, Chicago, Detroit, Cleveland, and Pittsburgh, all represent somewhat specialized manufacturing centers, their changes in manufacturing activity might be expected to be different from those of the whole nation. On the other hand, the nation's manufacturing is, to a large extent, concentrated in

TABLE 2

VALUE ADDED BY MANUFACTURE IN THE UNITED STATES AND IN THE SIX AREAS, 1919–1939

(Base of unadjusted data = 1899. Ratios of index to 1919–1939 trend)

Year	Los Angeles index	San Francisco index	Chicago index	Detroit index	Cleveland index	Pittsburgh index	United States index
1919	80.4	113.8	96.2	118.3	108.5	116.3	103.7
1921	79.8	82.3	78.1	62.4	67.3	64.9	76.1
1923	99.7	105.8	106.3	109.6	114.0	121.0	107.9
1925	113.8	100.4	115.2	120.8	113.2	109.8	112.3
1927	126.0	106.8	119.4	109.5	111.2	108.6	116.2
1929	156.6	123.3	140.3	125.6	145.2	136.6	134.9
1931	85.5	93.3	79.9	73.0	71.0	64.8	84.9
1933	57.3	62.2	56.1	53.8	51.4	42.8	62.5
1935	79.8	88.4	81.3	94.5	79.8	73.3	84.3
1937	102.7	99.0	110.9	121.8	109.8	131.7	109.3
1939	114.7	125.3	116.4	111.2	128.7	130.2	107.7

SOURCE: *United States Census of Manufactures.*

these and similar urban areas. The latter consideration would tend to make fluctuations in the areas and the nation more alike. To test these two possibilities, value added data have been taken from the *Census of Manufactures* and have been processed in a manner designed to permit comparison of the six areas and the United States. The original value added figures were converted into an index, a straight-line trend for the 1919–1939 index values was computed, and the actual values were expressed as a percentage of trend.[28] The adjusted values appear in table 4. These data and the data for industrial and commercial power sales and bank debits appear in chart 1.

Biennial data such as those appearing in table 2 do not lend themselves well to the study of cycles, for peaks or troughs might well have occurred in the intercensal years. Thus, accurate dating of turning points in this case is impossible. Also, the percentage change between low and high

[28] A lengthy discussion of trend adjustment is to be found in chap. ii, pp. 33–46.

points is only a crude basis for comparison, since values in years not reported might well be extremes. Neither is the measurement of the dispersion of each series about its mean as satisfactory as if even yearly data were available. Nonetheless, the data in each area have similar shortcomings, and the intent here is merely to show that significant differential stability exists between the national and local areas.

The year 1921 was a trough year in each area and in the United States. In that year Detroit, Cleveland, and Pittsburgh were from nine to fourteen points below the United States (therefore, relatively more depressed in that year). Los Angeles, San Francisco, and Chicago, on the other hand, were from two to six points above. In 1929, uniformly a peak year, all areas except San Francisco and Detroit were above the nation.

Although the per cent change from trough to peak as a measure of amplitude has its shortcomings, since the point from which the change is measured is of some relevance, this measure is usually easier to interpret than absolute standing at the turning points. In four industrial areas and the nation, where a continuous upswing in value added occurred between 1921 and 1929 (barring the possibility of recessions in the even years), the percentage increases ranged from 50 in San Francisco to 116 per cent in Cleveland. During this same interval, the increase in the nation as a whole was 77 per cent.[29] In Pittsburgh and Cleveland, between 1921 and 1929, an intervening cycle with a trough in 1927 makes direct comparison with the other areas and with the nation misleading.

Value added by manufacture declined in all areas between 1929 and 1933.

Area	Trend-adjusted index, 1933	Per cent decrease from 1929
Los Angeles	57.3	63.4
San Francisco	62.2	49.6
Chicago	56.1	60.0
Detroit	53.8	57.2
Cleveland	51.4	64.6
Pittsburgh	42.8	68.7
United States	62.5	53.7

The decreases have a 19.1 per cent range. In the upswing following 1933, a peak in 1937 appears only in the United States, Pittsburgh, and Detroit, for in the remaining areas, by 1939, the recovery was sufficient

[29] The year 1924 was, in general, depressed, and the absence of data for that year undoubtedly accounts for the comparatively long upswing reflected in the series.

to hide the 1938 trough and, therefore, a continuous increase in the adjusted index values occurred between 1933 and 1939. The increases from 1933 to 1937 were 74.9, 126.4, and 207.7 per cent in the United States, Detroit, and Pittsburgh, respectively.

On the basis of these data the conclusion might be that in general Pittsburgh is most unstable and San Francisco most stable. In view of the very imperfect comparison, it is wisest to postpone judgment of comparative stability and confine conclusions to the fact that, between the areas themselves and between each of the areas and the United States, there are wide differences in the cyclical reaction of their manufacturing activities.

Additional evidence of differences in business change in the areas and the nation is revealed by some further measures. The method by which the trends were fitted to the data makes the arithmetic mean of the adjusted data very close to 100.0 in each case. The adjusted data have been treated as frequency distributions and some ordinary measures of dispersion about the mean have been calculated.[30] These are the standard deviation and the coefficient of variation (indicating the dispersion of the distribution about the mean). The latter is used wherever the arithmetic means of the values in the series differ substantially. Thus, in studying cycles as frequency distributions, the coefficient of variation is used, since the means of the distributions are usually unlike. On the other hand, in treating longer periods as distributions the means tend to equal 100.0 and, therefore, the standard deviation is sufficient.

Area	Standard deviation
Los Angeles	26.0
San Francisco	17.3
Chicago	23.1
Detroit	24.5
Cleveland	27.4
Pittsburgh	31.0
United States	19.7

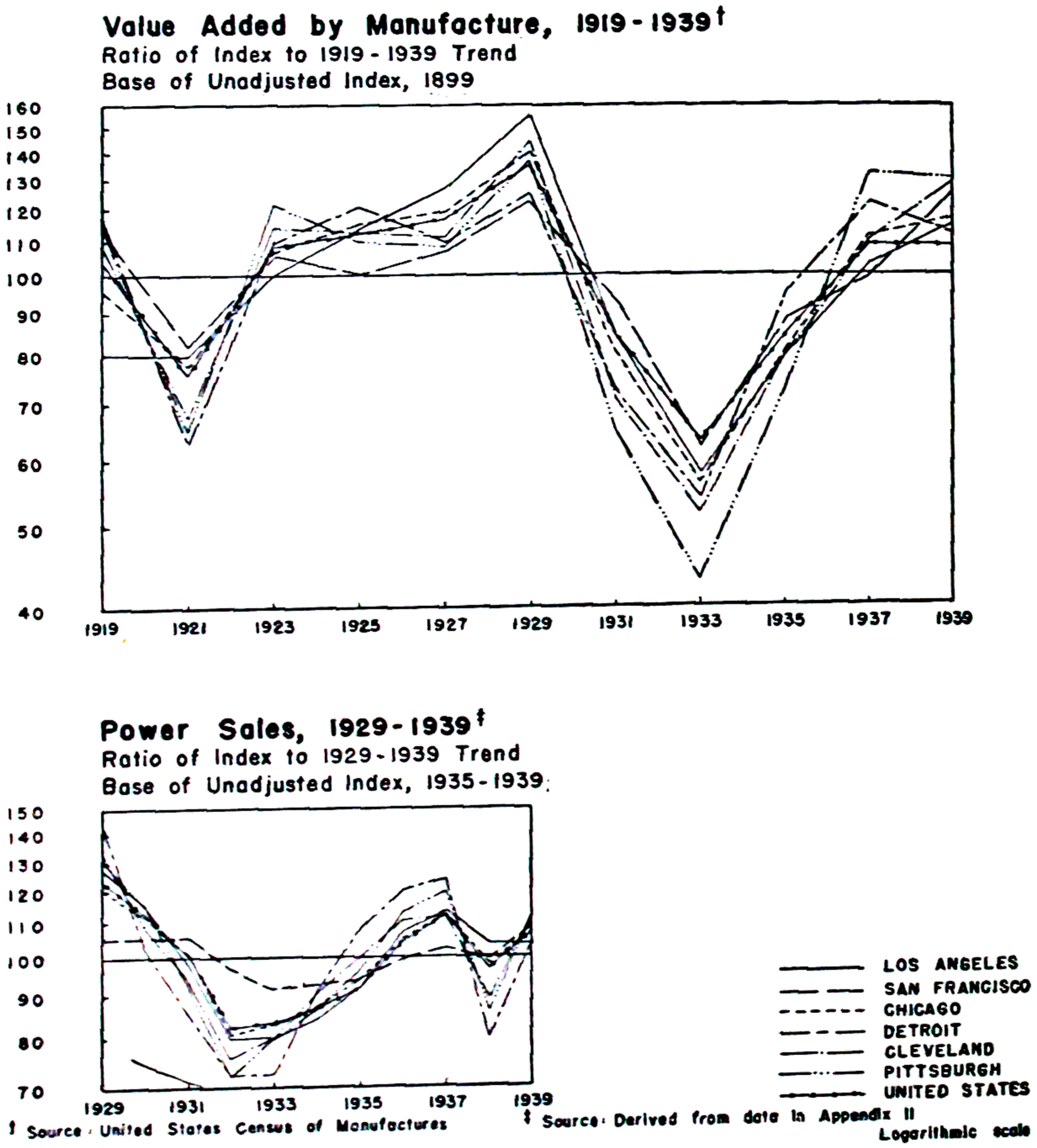
These data show that over the period, regardless of the number of cycles involved and their timing, the adjusted values tend to lie closer to the mean (100.0) in San Francisco than, for example, in Pittsburgh. Theoretically, assuming the distribution to be normal, 68 per cent of the

[30] At certain points the average duration is utilized. It has important shortcomings in some uses, however. It does not permit adjustment for differing means, and cannot be interpreted with the same precision.

items will be found within the limits of the mean plus and minus one standard deviation. Thus, a wider spread about the mean is required for Pittsburgh, Cleveland, and Los Angeles to encompass 68 per cent of the adjusted values than for San Francisco, Chicago, and the United States. These measures, standard deviation or coefficient of variation, add substantially to the description of the data and of changes in the data. Some idea of pattern is apparent where otherwise only isolated changes are noted. In later chapters, the latter measure will be applied to values lying wholly within a single cycle and will be utilized in the comparison of cycles between the various areas.

CHART 1

Recent Cycles in Value Added by Manufacture, Power Sales, and Bank Debits, United States and Six Areas

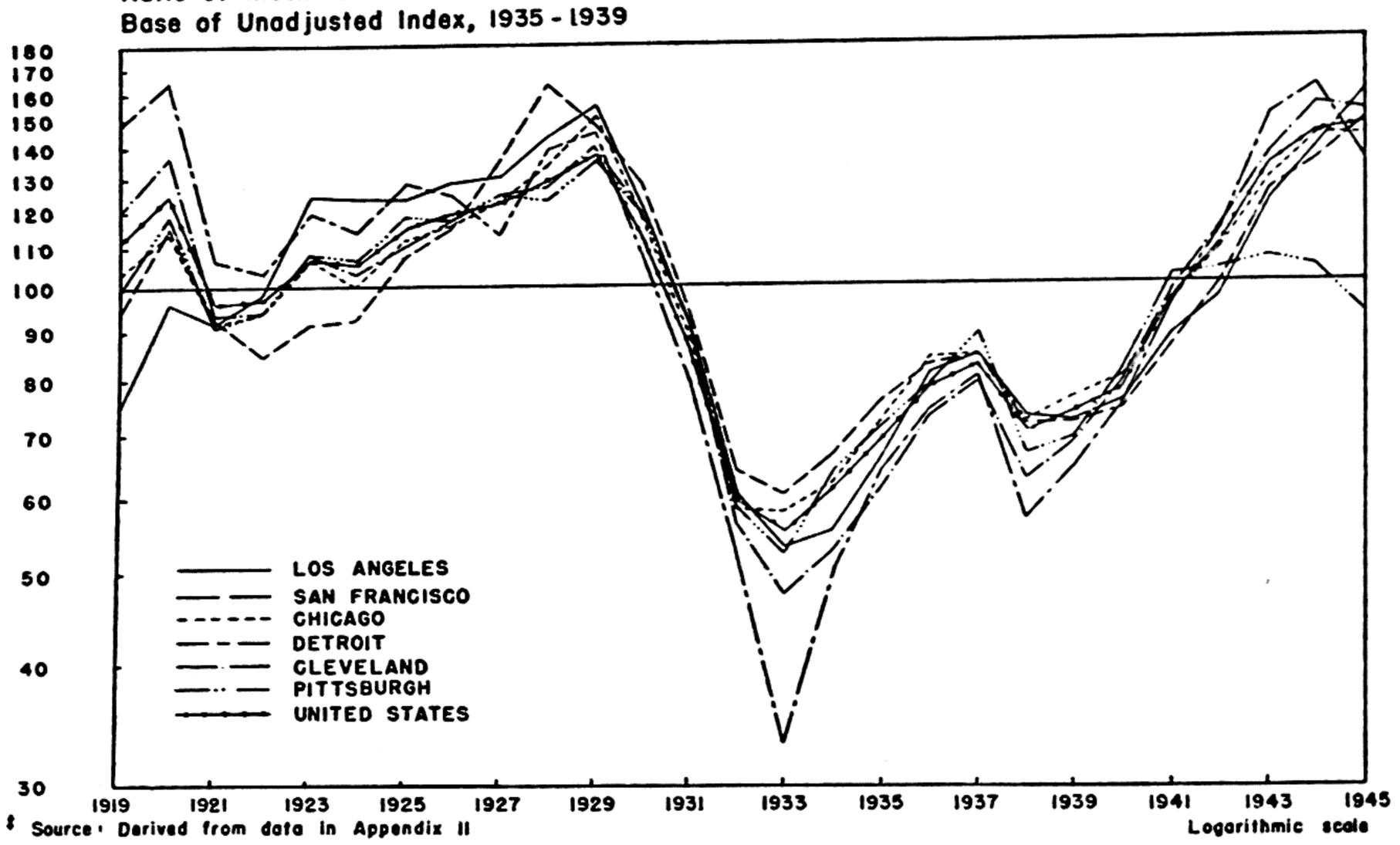


† Source: United States Census of Manufactures

‡ Source: Derived from data in Appendix II
Logarithmic scale

CHART 1 - CONTINUED

Recent Cycles in Value Added by Manufacture, Power Sales, and Bank Debits United States and Six Areas



Another indication of the divergences in cyclical reaction between the areas is to be seen from the study of power sales data (see chart 1). Though a detailed examination of power sales series will be made later, at this point a comparison of yearly values serves further to demonstrate the fact that "the cycle" is not everywhere the same. The values of the trend-adjusted index of power sales at the 1932 trough in each area are: Los Angeles, 79.7; San Francisco, 91.7; Chicago, 81.6; Detroit, 72.0; Cleveland, 75.4; Pittsburgh, 71.8; and United States, 82.4.[31] Thus, the United States value is 14.7 per cent more than that of Pittsburgh, whereas San Francisco exceeds Pittsburgh by more than 28 per cent. In the revival following the lower turning point, very different rates of increase occurred. From the trough to the 1937 peak, San Francisco increased 11.1 per cent; United States, 35.6; Chicago, 38.0; Los Angeles, 41.5; Cleveland, 48.7; Pittsburgh, 66.2; and Detroit, 71.7. Detroit's increase was almost double that in Chicago and in the United States. The 1937 recession, as revealed by these data, shows similar startling differences. Chicago and the United States declined 13 per cent; Cleve-

[31] The trough in San Francisco is 1933, and in the other areas, 1932. It should also be remembered that the San Francisco series includes residential power sales.

land, 21; Pittsburgh, 27; and Detroit, 36 per cent. A negligible decline took place in San Francisco, and Los Angeles was not included since it had no trough after the peak of 1937. The data above show that great differences appear between the several cities so far as cycles in manufacturing and in power sales are concerned.

Differences are not confined to cycles in manufacturing alone, but are also to be found in other economic activities. To illustrate this, and also preliminarily to compare timing and duration of cycles in the areas, monthly indexes of bank debits have been processed (see chart 1), and the relevant data from the 1920 peak to the next succeeding peak are shown in the table.[32]

Area	Peak dates	Duration (months)	Mean of index values	Coefficient of variation (per cent)
Los Angeles	8/20, 2/24	42	103.6	18.2
San Francisco[a]	6/20, 3/26	69	97.3	12.2
Chicago	8/20, 3/23	31	96.9	10.6
Detroit	2/20, 5/23	39	124.0	21.5
Cleveland	8/20, 5/23	33	100.8	16.4
Pittsburgh	11/20, 1/23	26	95.8	15.0
United States	6/20, 5/23	35	102.4	10.7

[a] This cycle is not included in further timing comparisons because it does not conform to the limits established in chap. iii, below.

These data show the earliest peak date to be February, 1920 in Detroit, and the latest to be in November of that year in Pittsburgh. Terminal peaks range from January, 1923 in Pittsburgh to March, 1926 in San Francisco, more than three years apart. The durations range from twenty-six months in Pittsburgh to sixty-nine in San Francisco. In general, the variation coefficient indicates that Detroit varies twice as much as the nation and that Los Angeles is more unstable than San Francisco, Chicago, Cleveland, Pittsburgh, and the United States. Trough dates likewise differ, for the date of the trough between these peaks varies from March, 1921 in Los Angeles to March, 1922 in San Francisco.

In the remainder of the 1920 decade, there were several cycles in debits, but none registered in all the areas. San Francisco, Detroit, Pittsburgh, and the United States all had cycles with a low point ranging from August, 1924 to November, 1926 and terminal peaks from November,

[32] Turning-point dates, based on the trend-adjusted index values, represent the center month of the three months having the highest and lowest average, in order that any possibility of unusual deviations be discounted. See chap. iii.

1925 to May, 1928. In the other areas there was no uniformity other than a general peak date in 1929. Thus, even in the early period of the 1920's, when all areas registered a cycle somewhat similar in timing, substantial differences existed; in the later period, no general cycle in all areas could be identified.

The major cycle with peaks in 1929 and 1937 did appear in all areas in bank debits, and in this case there was less variance in turning-point dates than in the earlier cycle. Nonetheless, sufficient differences exist to justify separate study, and it is this justification which is the aim of this particular examination. The debit data are given in the following tabulation.

Area	Dates			Duration (months)	Mean of index value	Coefficient of variation (per cent)
	P	T	P			
Los Angeles.....	9/29	3/33	4/37	91	78.6	29.8
San Francisco.....	10/29	3/33	1/37	87	83.9	32.4
Chicago.....	9/29	12/32	1/37	88	81.9	33.6
Detroit.....	10/29	3/33	4/37	90	69.6	37.5
Cleveland.....	9/29	5/33	4/37	91	75.1	30.9
Pittsburgh.....	10/29	11/32	4/37	90	79.3	28.8
United States.....	9/29	4/33	3/37	90	77.4	28.9

It is not surprising, in view of the violence of this cycle, that the variance in turning points is small, only one month at the peak in 1929, six months at the trough, and three months at the final peak.[33] Similarity of terminal dates makes duration differences also small, eighty-seven to ninety-one months. Mean values of the index, however, are quite different: 69.6 in Detroit and 83.9 in San Francisco. The coefficients of variation likewise differ substantially.

It is obvious, from this brief consideration of manufacturing value added, power sales, and bank debits, that there are significant differences in the timing, amplitude, duration, and pattern of cycles between the areas and the United States. It is inaccurate to assume that the study of the character of national cycles reveals all the characteristics of cycles

[33] When the three months used to determine turning points include March, the month including the bank holiday, only the two figures entered into the average in each case except Los Angeles and San Francisco. This might conceivably distort the turning point somewhat, since in Chicago, Cleveland, Pittsburgh, and the United States, the March low has been thereby discounted, whereas in Los Angeles and San Francisco the low of March is included in the average. In this particular instance, however, the turning point date is not altered in either Los Angeles or San Francisco by omitting March values. Neither is the mean or the coefficient of variation altered significantly.

in particular regions and areas. It is also unwise to confine a study of industrial area cycles to one area. There is no substitute for painstaking examination of the cyclical pattern in *all* geographic areas within the nation, even though it be an endless task.

The Economic Pattern of the Areas

The most common explanation for a varying degree of stability that is imagined or observed in a given area runs in terms of a "favorable or unfavorable economic pattern" of that area. Usually a highly diversified economy is considered a favorable pattern, whereas a specialized one is considered unfavorable.[34] Economic naïveté sometimes leads to a desire for diversification regardless of the specific economic pattern involved and almost regardless of cost. The cost of diversification is measurable only as the decrease in real income available which results from the failure to capitalize on differential resource endowment. Specialization of an area in the production of those goods and services which it can produce at relatively the least cost and in the trade of these goods with areas producing others has long been recognized as the basis for an expanded volume of goods and services available. Deliberate diversification might well reduce real income seriously. Economic instability likewise involves a real social cost, and a balancing of the real costs of diversification against those of instability might well justify diversification if it actually would provide stability.

Whether such a policy would yield the desired results depends in part upon the specific economic patterns resulting. An area producing only one item, such as bread, the demand for which is stable over the cycle, very likely would be more stable, however measured, than an area producing several different luxury items or many producers' goods items. In any event, the economic pattern of each area may be an important determinant of cyclical characteristics, and changes in these characteristics over time may account for changes in the cycle. Therefore, the examination of the economic pattern of the areas and of the changes in the patterns since 1920 is essential. It will assist in the explanation of cyclical variability, and it will test the validity of popular belief that, in general, stability and diversification go together.

[34] This general thesis has very wide popular acceptance, both among professionals and laymen. For example, in a National Broadcasting Company program (Art Baker's Notebook, KFI, June 16, 1947), the following observation was made: "One of the oldest and soundest of the proverbs is don't put all your eggs in one basket! Well, whether by accident or design, the southland has taken that advice. . . . It's good to know that our economy is diversified. . . . The economic climate's mighty fine, too." Again in this connection, William J. Fox, Chief Engineer of the Los Angeles County Regional Planning Commission, is reported in the *Los Angeles Times*, March 3, 1947, to have said, "We must achieve balance, above all, and avoid becoming dependent on too few sources of revenue."

Table 3 presents the percentage of total employment represented by each of the major industrial groups in the years 1930 and 1940 for the six areas and for the United States (the latter is included merely as a common basis for comparison).[35] The data present a number of interesting and significant facts, some of which relate to differences between the areas and others which relate to the changes in the several areas between the two census years. Probably, most important of the former type is the varying importance of manufacturing. Nearly one half of all employment in Detroit is found in manufacturing, whereas in the two western areas approximately one fifth is so employed. Even in the United States as a whole, the percentage is higher than in Los Angeles or San Francisco. Chicago, Cleveland, and Pittsburgh lie about midway between these extremes. On the other hand, the western areas employ larger proportions in agriculture, trade, finance, services, and government, with the greatest differences in trade, professional services, and government. Detroit, with heavy emphasis in manufacturing, is relatively least developed in transportation, personal, and professional services. Aside from manufacturing, outstanding and unique differences occur: concentration in government and transportation in San Francisco; specialization in amusements, personal services, and agriculture in Los Angeles; and the great emphasis on mining in Pittsburgh.

The changes that occurred over the period represent changes that have been widely recognized. In all areas trade, business and repair services, and professional services increased in relative importance, whereas the importance of construction and of personal services tended downward. In the western areas by 1940, employment in trade alone exceeded that in manufacturing.

Industrial area data are not available for 1920, but a comparison of the cities in 1920 and in 1940 indicates that these changes were going on in the decade of the 'twenties at least as rapidly as in the later period. For example, the increase between 1920 and 1940 in the percentage of total employment represented by trade in Los Angeles was from 18 to 25 per cent, 16 to 25 per cent in San Francisco, and slightly less in the eastern cities. At the same time manufacturing employment as a per cent of total declined from 31.6 to 18.2 per cent in the city of Los Angeles, 30.9 to 16.6 in San Francisco, and by smaller, but significant, percentages in the other cities.

The extent of diversification in the areas is measurable in a number of ways, none entirely satisfactory. The percentages in table 3 could be treated as frequency distributions and measures of dispersion computed.

[35] These groups in the two census years have been made strictly comparable by combining and regrouping the 1930 census data. Data for 1920 are available only by city.

TABLE 3

EMPLOYMENT PATTERNS IN THE SIX AREAS AND IN THE UNITED STATES, 1930 AND 1940

(Per cent of total employment)

Industry group	Los Angeles		San Francisco		Chicago		Detroit		Cleveland		Pittsburgh		United States	
	1930	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930	1940
Agriculture, forestry, and fishery	4.7	3.4	3.7	2.8	1.8	1.3	1.2	1.0	1.7	1.4	2.8	2.2	22.1	18.8
Mining	2.3	1.2	0.4	0.2	0.1	0.1	0.2	0.1	0.2	0.1	6.8	5.9	2.4	2.0
Construction	8.3	6.3	6.9	5.7	7.6	3.9	7.5	3.9	7.7	4.0	6.5	4.1	6.2	4.6
Manufacturing	19.1	19.8	22.0	20.3	31.9	34.7	47.0	48.1	39.1	38.7	38.7	37.1	23.3	23.4
Transportation	6.2	7.2	11.3	11.1	9.3	9.9	5.4	5.6	7.8	8.0	8.3	8.3	6.7	6.9
Wholesale and retail trade	18.7	24.0	16.9	22.4	17.3	21.3	13.0	17.4	15.5	19.9	13.3	17.2	12.5	16.7
Finance, insurance	6.7	5.7	5.8	6.7	4.7	5.1	3.5	3.5	3.4	4.0	2.7	3.2	2.9	3.3
Business and repair services	1.2	3.1	0.6	2.6	0.8	2.4	0.9	1.9	0.8	2.2	0.6	1.7	0.9	1.9
Personal services	13.3	10.6	12.4	9.7	11.5	8.4	9.8	7.3	10.6	8.3	8.7	7.4	9.9	8.9
Amusements, recreation	3.8	4.2	1.2	1.5	1.2	1.1	0.9	1.0	1.0	0.9	0.7	0.8	0.9	0.9
Professional and related services	9.0	9.1	7.8	8.9	6.4	7.2	5.3	6.3	6.8	8.2	6.0	7.7	6.0	7.4
Government	3.3	4.5	3.9	6.5	3.0	3.6	3.0	3.0	2.4	3.3	2.0	3.1	2.8	3.9

SOURCE: *United States Census of Population, 1930, 1940.*

Again the absolute range is a measure of diversification, a wide range indicating concentration and a narrow one the opposite. Also, the percentage of total employment in the single largest industry, or the two, three, or four largest, indicates the degree of specialization. The range of the 1940 percentages (from table 3) and the per cent of total in the four largest and in the single largest industries in the areas are shown in the following table.

Area	Range	Per cent of total employment	
		Four largest	Single largest
Los Angeles	22.8	63.5	24.0
San Francisco	22.2	63.5	22.4
Chicago	34.6	74.3	34.7
Detroit	48.0	79.1	48.1
Cleveland	38.6	75.1	38.7
Pittsburgh	36.3	69.4	37.1
United States	22.5	67.8	23.4

There can be no doubt that Los Angeles, San Francisco, and the nation as a whole are more diversified than the other areas, nor that Detroit is more specialized. But diversification, per se, is not a particularly meaningful concept; as mentioned above, the specific character of the economy seems to be of far greater significance. The specific pattern, and hence a better picture of the economies of the areas, is revealed, not by ranges or general measures, but by detail such as that in table 3.

The nature of some of the industrial groups of table 3 is evident from their titles, and differences between the areas of some groups (e.g., construction) are small. Employees in construction in each area produce the same things, and for a local market. The organization of the industry in each area is similar.[36] The same observations hold for many of the groups but definitely do not hold for manufacturing. For this reason, additional detail referring to manufacturing is necessary in order that a useful picture of the differences in the several regional economies be available.

Specialization in Manufacturing

Table 4 presents the percentages of total manufacturing employment accounted for by each of the major groups of manufacturing industries

[36] Actually, differences in the product of the construction industry do exist. In an area constant in population, but industrially growing rapidly, industrial construction will be relatively more important than residential construction as compared with an area where industrial growth has ceased. Such a set of circumstances is unlikely, and in any case the primary and basic differences between the areas will be reflected in industrial and population statistics themselves.

TABLE 4

PERCENTAGE OF MANUFACTURING EMPLOYMENT BY GROUPS, 1929 AND 1939

Industrial group	Years	Los Angeles	San Francisco	Chicago	Detroit	Cleveland	Pittsburgh	United States
Total, all manufacturing (actuals)	1929	92,044	62,116	450,852	245,242	150,065	197,752	8,414,803
	1939	134,090	81,732	532,181	326,947	155,309	209,010	7,886,579
Durable goods[a]	1929	45.3	38.6	54.1	88.8	74.9	86.7	48.3
	1939	48.9	42.2	53.7	85.7	71.1	84.2	44.1
Forest products	1929	10.8	9.0	6.6	1.3	2.4	0.8	10.3
	1939	6.9	4.8	4.7	1.0	2.6	1.4	8.2
Stone, clay, and glass products	1929	5.6	2.6	1.8	0.9	1.2	8.7	3.9
	1939	4.5	3.3	1.6	1.5	1.4	9.1	3.6
Iron and steel and their products	1929	19.8	9.4	24.8	12.3	44.5	60.2	16.1
	1939	12.5	14.7	22.0	9.8	29.7	55.9	12.3
Nonferrous metals and their products	1929	2.6	2.7	2.4	4.2	2.6	0.9	3.3
	1939	2.8	2.9	3.7	5.2	8.0	5.8	3.2
Machinery, not including transportation	1929	3.6	7.8	14.8	4.4	11.7	10.4	7.9
	1939	8.3	6.4	19.1	9.0	20.4	10.9	9.9
Transportation equipment	1929	3.1	7.1	3.7	65.6	12.5	5.5	6.8
	1939	13.9	10.1	2.8	59.2	9.0	1.1	7.1

Nondurable goods[a]	1929	52.3	55.9	40.3	8.7	23.4	12.1	47.1
	1939	48.1	54.5	40.6	12.6	26.9	14.4	51.5
Food and kindred products	1929	17.0	26.2	13.6	4.2	5.9	6.0	9.0
	1939	14.7	22.5	12.9	3.8	5.9	6.7	10.4
Textiles and their products	1929	12.5	5.4	9.3	0.4	9.0	0.5	20.4
	1939	14.7	9.0	9.5	1.5	10.8	1.2	23.1
Paper and allied products	1929	1.7	1.4	2.5	0.4	0.6	0.3	2.9
	1939	2.7	2.7	2.5	0.8	1.1	0.6	3.4
Printing, publishing, and allied industries	1929	7.5	10.3	9.9	2.8	4.8	2.1	4.3
	1939	5.4	7.4	7.8	1.9	4.2	2.0	4.1
Chemicals and their products	1929	1.8	5.3	2.4	1.0	2.2	1.2	3.3
	1939	2.7	6.5	3.0	3.7	3.1	1.7	3.6
Products of petroleum and coal	1929	4.6	6.0	1.2	....	0.8	2.0	1.7
	1939	3.2	4.6	1.9	0.5	1.5	2.1	1.2
Rubber products	1929	6.3	0.7	....	....	....	....	1.8
	1939	3.3	0.4	0.4	0.2	0.3	....	1.5
Leather and its manufactures	1929	1.0	0.6	1.4	....	0.0	....	3.8
	1939	1.3	1.3	2.7	0.2	0.0	0.2	4.2

SOURCE: *United States Census of Manufactures, 1930 and 1940.*
[a] Discrepancies in totals owing to rounding.

as defined by the census in the years 1929 and 1939. These data show that durable goods industries predominate in Pittsburgh and Detroit, employing between 80 and 90 per cent of all wage earners in both 1929 and 1939 in those areas. Durable goods industries were somewhat less important in Cleveland, but, nonetheless, they represented 71 per cent of the total employment in 1939. In Los Angeles, San Francisco, and Chicago, durable goods are much less important. These three areas, in their concentration in durable goods production, are much like the United States as a whole. Detroit and Pittsburgh concentrate most heavily in transportation equipment and in iron and steel products, respectively, though the relative importance of these two groups declined rather substantially in the ten-year interval ending in 1939. The other major industries in these two areas in the durable goods field are iron and steel products in Detroit and machinery in Pittsburgh. Though the concentration in durable goods in Cleveland is high, there is wider diversification. In that area, the largest single group in 1939 was iron and steel, but it employed only 30 per cent of all wage earners, whereas in Pittsburgh 56 per cent were so employed. No single industry group in the durable goods group in the West is as large, relatively, as transportation equipment and iron and steel in the eastern areas. The largest durable goods group in Los Angeles in 1939 was transportation equipment, whereas in San Francisco it was again iron and steel; but San Francisco's iron and steel industry employed only 14 per cent of the total number of manufacturing wage earners.

Nondurable goods production ranks far lower in importance in the East than in the West, though in Chicago a very sizable employment is to be found in nondurable goods operations. In Detroit, for example, only 12 per cent of all wage earners are to be found in nondurable goods, whereas the largest single nondurable goods group employs only 3.8 per cent of the total. The next largest, chemicals and their products (in Detroit principally a producers' goods industry and which is closely allied to automobile production), employed 3.7 per cent of all wage earners. In contrast to the eastern areas, San Francisco's food industry was the largest in the area, either durable or nondurable, accounting for 22 per cent of total employment. In Los Angeles in 1939, two nondurable goods groups, food and textiles, exceeded in size the largest durable goods group. It is interesting to note, however, that changes which were making the areas more alike were evident in this decade. Durable goods production in the two western areas was growing relatively, whereas in the East (even in Chicago) durable goods production was declining in relative importance. On the other hand, nondurable goods production was declining in the West and increasing in the East, though the divergences still are very marked.

The Five Largest Manufacturing Industries

The five largest groups in each of the areas in 1939, whether they be durable or nondurable goods, accounted for 64 per cent of total manufacturing employment in Los Angeles and San Francisco, 71 per cent in Chicago, 78 per cent in Cleveland, 87 per cent in Detroit, and 88 per cent in Pittsburgh. Obviously, there is far greater specialization within manufacturing in the eastern areas than in the West, even when, in this manner, we discount the magnitude of the single largest industry in each area. Therefore, important differences in manufacturing exist between the two western areas (Los Angeles and San Francisco) and the three eastern areas (Detroit, Cleveland, and Pittsburgh). Chicago lies somewhat between these two extremes.

In every area, except Los Angeles and Cleveland, the proportion of the total employment accounted for by the five largest groups was greater at the trough of the depression in 1933 than in either 1929 or 1939. In Los Angeles, the percentage of total employment increased steadily in the five largest groups after 1929, and by 1939 this percentage exceeded its 1929 and 1933 counterpart by a substantial margin. In Cleveland, on the contrary, the five largest industries declined steadily between 1929 and 1939. Generally speaking, therefore, it may be said that the five largest industries taken as a group in each of the areas are more stable than the remaining industries in the area, though this does not necessarily mean that these large industries are notably stable. It does mean, however, that a relatively larger proportion of the shock to employment from cyclical fluctuation is absorbed by the less important industries in the areas. Furthermore, of the five largest industries taken separately, the larger ones absorb relatively less shock than the smaller ones. For example, in Pittsburgh, iron and steel and their products employed 60 per cent of total manufacturing employment in 1929, 65 per cent in 1933, and 56 per cent in 1939. The five largest industries in Pittsburgh employed, however, only 4 per cent more workers in 1933 than in 1929, and 3 per cent more in 1933 than in 1939. In San Francisco, likewise, it was the larger of the major industries that declined least during the depression, so that its relative importance increased.

Manufacturing employment consists of employment in a large variety of activities, and the group data appearing in Table 4 somewhat hide the character of manufacturing because the specific industries within a given group may vary widely. For example, in Los Angeles the transportation equipment group consists largely of aircraft and parts, whereas in Detroit it consists almost completely of automobiles and automobile parts. Thus, some consideration of the particular classifications (as dis-

TABLE 5

THE FIVE LARGEST INDUSTRIAL CLASSIFICATIONS IN SIX AREAS, 1939

Classification	Number of wage earners	Per cent of total manufacturing
LOS ANGELES		
Aircraft and parts, including aircraft engines	14,364	10.6
Bread and other bakery products	6,335	4.7
Furniture, including store and office fixtures	5,843	4.3
Petroleum refining	4,290	3.2
Rubber tires and inner tubes	3,603	2.7
Total	34,435	25.6[a]
Total manufacturing	134,989	100.0
SAN FRANCISCO		
Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles, and sauces	5,424	6.6
Petroleum refining	3,787	4.6
Steel-works and rolling-mill products	3,778	4.6
Bread and other bakery products	3,647	4.5
Ship and boat building, steel and wooden, including repair work	3,015	3.7
Total	19,651	24.0
Total manufacturing	81,732	100.0
CHICAGO		
Steel-works and rolling-mill products	57,268	10.8
Electrical machinery, apparatus, and supplies	25,720	4.8
Meat packing, wholesale	19,281	3.6
Printing and publishing, book, music, and job	16,836	3.2
Bread and other bakery products	15,391	2.9
Total	134,496	25.3
Total manufacturing	532,181	100.0

SOURCE: *United States Census of Manufactures, 1939.*
[a] Discrepancies owing to rounding.

TABLE 5—*Continued*

Classification	Number of wage earners	Per cent of total manufacturing
DETROIT		
Motor-vehicle bodies and motor-vehicle parts	191,443	58.6
Bread and other bakery products	9,298	2.8
Nonferrous metal alloys; nonferrous metal products, except aluminum, not elsewhere classified	5,946	1.8
Machine-tool accessories and machinists' precision tools	5,378	1.6
Machine-shop products	4,849	1.5
Total	216,914	66.3
Total manufacturing	326,947	100.0
CLEVELAND		
Steel-works and rolling-mill products	17,024	11.0
Motor-vehicle bodies and motor-vehicle parts	8,800	5.7
Electrical machinery, apparatus, and supplies	6,821	4.4
Clothing, men's, youths', boys', not elsewhere classified—regular factories	4,973	3.2
Nonferrous metal alloys; nonferrous metal products, except aluminum, not elsewhere classified	4,837	3.1
Total	42,455	27.3[a]
Total manufacturing	155,309	100.0
PITTSBURGH		
Steel-works and rolling-mill products	85,011	40.7
Glass	11,037	5.3
Bread and other bakery products	5,063	2.4
Machine-shop products	4,996	2.4
Structural and ornamental metalwork, made in plants not operated in connection with rolling mills	4,915	2.4
Total	111,023	53.1[a]
Total manufacturing	209,010	100.0

[a] Discrepancies owing to rounding.

tinguished from groups) that are important in the various areas is essential. The five largest classifications (i.e., specific industries) in San Francisco employed 24.0 per cent of total manufacturing employment in 1939; in Chicago, 25.3 per cent; in Los Angeles, 25.5 per cent; in Cleveland, 27.3 per cent; in Pittsburgh, 53.1 per cent; and in Detroit, 66.3 per cent. The largest five, therefore, employ about the same percentages of the total in Los Angeles, San Francisco, Chicago, and Cleveland, though much higher percentages occur in Detroit and Pittsburgh. The names of these five industries, together with the number of wage earners and the per cent of total manufacturing employment which they accounted for in 1939, appear in table 5. Comparable data for 1929 and 1933 appear in appendix iii.

In four of the six areas the five largest single industries (classifications) showed the same tendency (an increase in relative importance at the depth of the depression) as did the five largest industrial groups. The two exceptions in this case, however, are Detroit and Chicago. The five largest industries in the former grew steadily. At the same time, in the latter (Chicago) the five largest industries declined substantially in relative importance, accounting for 36 per cent of total manufacturing employment in 1929 but only 25 per cent in 1939.

In summary then, it can be seen that the areas differ significantly, with the greatest difference existing between the western and the eastern areas, both from the point of view of all economic activity and from that of manufacturing alone. They are alike only so far as they are important industrial areas. They differ in absolute size, in degree of diversification, and in specific economic pattern. These differences may bring about divergent cyclical reactions, and then again the similarity that does exist between the areas may be sufficient to offset whatever peculiar characteristics might result from differences. In later chapters, upon completion of the study of the timing, amplitude, and pattern of cycles in each of the areas, an attempt will be made to explain the relationship between the economy of each area and its cycles.

CHAPTER II

SECULAR AND SEASONAL CHANGE IN THE AREAS

THE EMPIRICAL study of business cycles requires, at the outset, a solution to the practical problem of eliminating from business data all changes which are not essentially cyclical in character. This problem does not present any difficulty of a conceptual nature once either the cycle itself or the noncyclical changes are defined. Although a consensus does not exist with respect to the criteria which establish the precise boundary between these changes, the margin of disagreement is certainly small. All that is required on theoretical grounds is consistency in definition and in use. Unfortunately, the practical problem is substantially more perplexing, for the way in which statistical series are processed in removing the noncyclical elements may affect the timing, amplitude, and pattern of the cyclic residual.

Business changes are commonly classified in four separate groups—seasonal, cyclical, erratic, and secular—but the bases for this fourfold classification differ greatly. Seasonal variation is limited to periodic changes occurring within a relatively short time span, normally a single year, that result from either natural or institutional causes. Climatic changes alter the conditions affecting both the production and the consumption of goods and services; and institutional factors, such as unequal length of calendar and work months, holidays, and the like, are also important considerations. Seasonal variations are changes which are sufficiently regular to be reasonably removed from time series by several methods. The method adopted in this study by which seasonal fluctuations are removed from the data is the subject of extended treatment later in this chapter.

Irregular, sharp changes caused by random events arising outside the normal business routine (episodic changes) must be differentiated from other movements. They differ from seasonal change because of nonperiodicity, and they differ from secular movement both because they are usually confined to short-term gyrations and because their origins are usually extra-economic, found in accidental events not proximately associated with voluntary entrepreneurial decisions. Events such as floods, fires, and other calamities, together with strikes and random legal and technological changes, are most commonly listed as causes of these episodic, erratic, or accidental changes.

It is in the distinction between erratic and cyclical changes that the greatest conceptual problem arises. Definitions of cycles seldom rest

upon either cause or periodicity. In fact, most definitional attempts, as distinguished from theories of the cyclical process, often explicitly omit random factors as a cause of cyclical fluctuation. On the other hand, many descriptions and explanations of the cyclical process lean heavily upon the existence of these accidental exogenous factors.

Distinction between these factors and cyclical changes can be made only upon the basis of the time period commonly attributed to each. Even a consideration of possible causes for each yields no satisfactory basis for distinction, since the causal forces attributed to business cycles vary from J. A. Schumpeter's "swarms of innovations" to purely endogenous phenomena, such as, for example, R. G. Hawtrey's "internal drains"; also the accidental factors are sometimes attributed to strikes, changes in law, and other matters not completely isolated from "normal" business processes. Both types of changes are, therefore, essential and sometimes indistinguishable elements in business fluctuations.

Even though, conceptually, the distinction between these erratic factors and cyclical changes is difficult to establish, empirical cyclical studies commonly employ some means of discounting or ignoring what appear to be wide random fluctuations.[1] Such a policy can be defended when the specific cause or causes of the deviation are known or if it represents a sharp break with the general pattern of the period in which it falls, but there is no simple rule for dealing with these changes. The use of moving averages is sometimes recommended, but this may give rise to pseudocyclical movements owing to the mathematical spreading of isolated peaks and troughs.[2] On the other hand, some extreme short-term movements represent accentuations of changes of a longer and more generalized nature and, therefore, should be taken into account.

No uniform method for dealing with episodic changes is utilized in this study. Though none of the graphic materials presented hereafter are smoothed, the choice of turning points normally involved the use of the center month of the three months having the highest or lowest total immediately before a major upswing or downswing. In this way, single-month peculiarities occurring at critical times were spread and discounted. In certain cases, however (e.g., in Detroit, industrial employment in April, 1920; December, 1921, 1924, 1926, and 1927) wide fluctuations in a single month were completely ignored in establishing turning points. For all other purposes, such as measuring the general pattern of cyclical behavior by the use of frequency distributions, all monthly deviations were tabulated.

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[1] Cf. A. F. Burns and W. C. Mitchell, *Measuring Business Cycles*, pp. 58–59, 64.
[2] . Burns and Mitchell, *op. cit.*, pp. 63–64, and chap. viii.

The Nature of Secular Change

The treatment of secular or long-term trend also presents important problems to the student of business cycles. The "common sense" of trend analysis, as Schumpeter points out, is that "the normal business situation itself changes in time"; the problem, therefore, is to disentangle from the actual figures of each moment that pattern which is normal at that moment and with reference to which the actual data are to be appraised.[3] From this standpoint, the elimination of trend is as justifiable as the adjustment for seasonal variation.

The best theoretical basis for secular adjustment is provided by the differences between the causal forces at work in determining the trend and cyclical processes. With respect to trend, the forces are conceived to be operating gradually and over comparatively long periods of time; with respect to the cycle, the forces operate in an oscillatory manner over shorter periods. This basis for adjustment, though it explicitly involves differences in the "usance" of the forces (in the periods over which they work), implies an ability to isolate accurately the particular forces at work and to describe the causal process. It has been argued that "if trend-analysis is to have any meaning, it can derive it only from previous theoretical considerations."[4] "Trend" in this sense is definitely the "real" trend, as distinguished from the purely "descriptive" trend,[5] and requires particular justification, as might be suggested by the stagnation hypothesis, or some other theory of capitalistic development. This consideration suggests the segregation of causes as such, but the fact still remains that the rate of change in trend is partly a result of cyclical variation and, conversely, cyclical characteristics are partly the consequence of secular change.[6] However, semipermanent consequences of cyclical variation might be assigned specifically to the category of forces which should be classified as secular, on grounds of pure theory, leaving the distinction between trend and cycles to be based upon the cyclical causes which have purely transitory effects upon business. The utilization of a trend in time series studies may be useful as a descriptive device, even though it is not defensible on the grounds of being the consequence of *only* long-run forces, and provided such use does not lead to unrecog-

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[3] Schumpeter, *Business Cycles*, Vol. I, p. 21.

[4] Cf. J. A. Schumpeter, "Mitchell's Business Cycles," *Journal of Political Economy*, Vol. 45, p. 166.

[5] These terms, "real" and "descriptive," are utilized by Schumpeter, *Business Cycles*, pp. 201, 204–205.

[6] Cf. Edwin Frickey, "The Problem of Secular Trend," *Review of Economic Statistics*, Vol. 16, pp. 201–202. Kondratieff states specifically that long waves (the same as trend in most empirical studies) leave a definite stamp on cycles. Cf. N. D. Kondratieff, "The Long Waves in Economic Life," reprinted in *Readings in Business Cycle Theory* (Philadelphia, 1944), pp. 20–42.

nized theorizing by implication. Since the purpose of this study is to measure and to compare relatively unforeseeable business changes, it seems wisest to revert to the "common sense" descriptive trend, if it is found expedient to deal with secular change separately.

In a statistical analysis of time series, several courses are open in the treatment of trend. One is to ignore it completely; another is to adjust for trend *only* when secular forces, as such, can be identified and their strength measured; still another is to fit "descriptive" trends to all data, looking upon them merely as norms from which to appraise the actual series. The adjustment of data which is preferred by the National Bureau of Economic Research may be interpreted as either the first or the last course. The arithmetic mean of all the values with a single cycle is treated as the norm from which cyclical changes are measured.[7] In the study of any single cycle, this method involves either an assumption of the absence of a real trend or a belief that trend adjustment is likely to create more distortion than exists in the absence of such adjustment. However, in the study of a series embodying several cycles, this practice may be interpreted as yielding a discontinuous trend for long periods which is horizontal during any single cycle. If thus interpreted, this method represents a somewhat curious compromise, since it involves the use of horizontal trends within single cycles, regardless of their length, and at the same time it involves the assumption that real long-run trends may be even very sharply upward or downward.[8] It is certainly true that faulty trend calculation may obscure or create cycles, but the same consequence may result from the use of either no trend or no intracycle trend if some positive or negative trend exists in reality. It is inconsistent to recognize long-term forces involving increments or decrements, and at the same time to treat the data in such a way that neither is recognized within a cycle regardless of its length. In so doing the entire burden of adjustment is placed on certain points in time that are fixed, not regularly, but by the existence of irregular cyclical termini. If a "real" trend upward or downward exists, it is characterized by continuous change.

Regardless of the fact that time series decomposition on the basis of separate causes is impossible, it still remains that there are few business series that are not subject to some long-term forces that impart a distinct upward or downward tendency to the data. There may be none in a series of unemployment expressed as a percentage of employment or as a percentage of total labor force, but such cases are exceptional. Since there is little possibility of establishing a "real" trend, the problem becomes

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[7] Cf. Burns and Mitchell, *op. cit.*, pp. 28, 33, 141–144.

[8] See H. A. Adler, A. F. Burns, and W. C. Mitchell, "Measuring Business Cycles: A Review," *The Annals of the American Academy of Political and Social Science*, July, 1947, p. 141.

one of deriving a descriptive trend and of remaining constantly aware that the trend is "descriptive," although it may approximate the "real." The compromise in this study involves the recognition of trend by the utilization of a continuous line fitted mathematically to the data; this practice should cause these trends to conform more closely to real trends than any discontinuous line whenever real forces operate.

This decision creates several practical problems. A continuous curve of any shape may be chosen, even one which follows the data as closely as a moving average of short period. On the other hand, a straight line may be fitted which does not lose value as a trend by too close a relationship to the data (unless fitted to very short periods). Dr. A. F. Burns, in *Production Trends in the United States Since 1870*, primarily uses exponential curves fitted to ten-year intervals because "the percentage rate of change provides the common unit which should prove most satisfactory in comparing secular trends of industries."[9] In the present study, straight-line trends are used as descriptive trends from which to measure month-to-month deviations. Though some students interpret straight lines as carrying the implication of a "future increase without limit,"[10] the trends of this study are not extrapolated, but are merely utilized as representative of the data at hand. Both long-term and short-term lines have been examined, with overlaps in the short ones, in order to obviate the possibility of undue distortion as a consequence of trend characteristics.

Secular Trends in the Areas

As an indication of the nature of the trends in the several areas, table 6 presents the percentage of the regression coefficient to the ordinate at the origin for the four basic series of this study.[11] The trends themselves are to be found in chart 2 and the formulae in table 7. Neither the table nor the chart provides a basis for judging the "fit" of the trends, but this basis is provided by charts 10 to 13 and by charts 15 to 22.

The data of tables 6 and 7 and chart 2 indicate clearly a number of significant facts. First, growth in Los Angeles generally has been more rapid than in the other areas. In only one case does the value in another area exceed that in Los Angeles, and that is in the bank debit series when the table 6 value in Detroit is 5.0 per cent as compared with 4.2 per cent in Los Angeles. This is due largely to the fact that over the decade of the 'thirties, Detroit declined less than did Los Angeles, whereas its increase

[9] A. F. Burns, *Production Trends in the United States Since 1870* (New York, 1934), p. 35.

[10] Mitchell, *Business Cycles*, p. 221.

[11] The origin is always the median of the series; hence, $EX = 0$. This device for describing trends is not new, but fairly uncommon. For similar use, see James G. Smith, "Money Market Periodicities and Interrelationships" in B. H. Beckhart, J. G. Smith, and W. A. Brown, *The New York Money Market* (New York, 1932), p. 547.

before 1929 and after 1939 kept pace rather well. Second, Chicago's trend is generally low, in table 6 ranking last in industrial employment and department store sales, next lowest in industrial and commercial power sales, and third in bank debits. Third, between series, there is more uniformity in the growth of industrial and commercial power sales and least uniformity in industrial employment.

TABLE 6

THE REGRESSION COEFFICIENT AS A PERCENTAGE OF THE 1932 ORDINATE, SELECTED SERIES IN SIX AREAS

Area	Industrial employment (per cent)	Department store sales (per cent)	Industrial and commercial power sales (per cent)	Bank debits (per cent)
Los Angeles	13.3[a]	4.1	14.1[e]	4.2
San Francisco	7.2[a]	3.2	5.5[d]	1.5
Chicago	0.1[b]	0.1[b]	6.8[c]	1.7
Detroit	2.3[c]	3.3[b]	7.0[c]	5.0
Cleveland	2.0[d]	2.0	9.1[c]	1.9
Pittsburgh	1.7[b]	0.2	8.4[a]	1.0

SOURCE: Computed from data in appendix ii. Unless otherwise noted, trend covers 1919–1945 period.
[a] Trend, 1925–1945.
[b] Trend, 1923–1945.
[c] Trend, 1920–1945.
[d] Trend, 1921–1945.
[e] Trend, 1927–1945.

There are many factors helping to account for these and other, less obvious, differences. In the first place, both Los Angeles and Detroit by far outstripped the other areas in population growth. The rates of population growth by decades since 1910 for the areas are given in the following table.[12]

Area	1910–1920 (per cent)	1920–1930 (per cent)	1930–1940 (per cent)
Los Angeles	85.8	135.8	26.1
San Francisco	29.8	34.9	8.1
Chicago	27.9	32.8	3.2
Detroit	118.1	65.7	8.1
Cleveland	44.9	26.7	1.5
Pittsburgh	19.6	15.0	2.9

Since 1920, Los Angeles grew in population twice as rapidly as its nearest competitor and, after 1930, it grew three times as fast. In the earlier decade, though Detroit was far below Los Angeles, still it was growing far more rapidly than the remaining areas; and in the 1930's, it was challenged for second place only by San Francisco. Detroit's most

[12] *United States Census of Population.*

rapid increase, however, came in the decade immediately preceding the 1910–1920 period. Cleveland, since 1920, and Pittsburgh, since 1910, have experienced relatively and steadily declining rates of population increase with practically no growth in the last decade. At that time, Chicago likewise experienced very little expansion of population.

The differential development of manufacturing in the several areas, discussed in some detail in chapter i, also has its effects on the trends of the series. Since the employment series utilized in this study represent industrial or manufacturing employment, it is not surprising that the

TABLE 7

TRENDS IN INDEXES OF FOUR SERIES, SIX INDUSTRIAL AREAS

Area	Industrial employment		Department store sales		Industrial and commercial power sales		Bank debits	
	a	b	a	b	a	b	a	b
Los Angeles.....	136.5	13.0[a]	106.5	4.4[f]	121.4	10.9[e]	110.2	4.6[f]
San Francisco.....	136.3	8.1[a]	108.0	3.4[f]	92.5	4.8[d]	120.3	1.8[f]
Chicago.....	118.1	0.1[b]	114.0	0.8[b]	95.7	6.3[c]	118.7	2.0[f]
Detroit.....	103.4	2.4[c]	118.1	3.7[b]	88.1	6.0[c]	118.3	5.9[f]
Cleveland.....	113.9	2.2[d]	110.6	2.2[f]	111.7	9.7[c]	132.4	2.5[f]
Pittsburgh.....	111.0	1.8[b]	120.2	0.2[f]	113.9	7.6[a]	126.9	1.3[f]

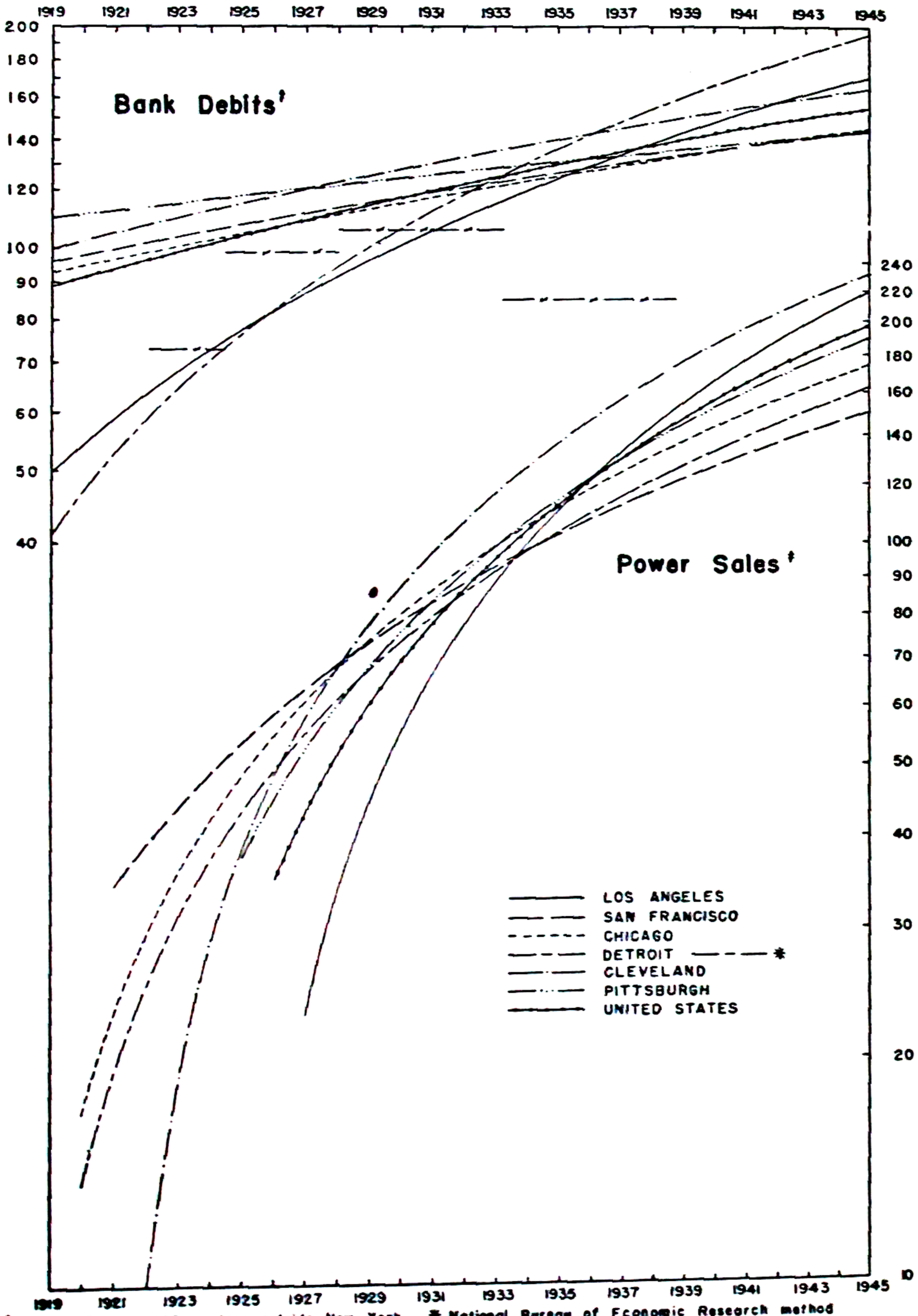
SOURCE: Derived from data in appendix ii. Origin is center of series, $\Sigma X = 0$, X = one year. The a and b values are the value of the ordinate at the origin and the yearly increment, respectively.

[a] 1925–1945.
[b] 1923–1945.
[c] 1920–1945.
[d] 1921–1945.
[e] 1927–1945.
[f] 1919–1945.

closest relationship exists between trends in employment and in manufacturing growth; however, it is surprising that there is so little apparent relationship between manufacturing growth and the trends in industrial and commercial power sales. Trends in value added by manufacture (which, from some viewpoints, are the best readily available measures of manufacturing growth) may be expressed in the same manner as were the other trends described in table 6. The percentages of the regression coefficient to the 1929 ordinate, referring here to 1919–1939 trends for each area in value added by manufacture, are: Los Angeles, 3.6; San Francisco, 1.7; Chicago, 0.4; Detroit, 1.7; Cleveland, 0.5; and Pittsburgh, 1.0. Manufacturing in Los Angeles, like its population, was increasing more rapidly than elsewhere, and at more than twice the rates in the other areas. The discrepancy between the San Francisco value as compared with the employment percentage in that area in table 6 calls for some comment. The latter figure, 7.2 per cent compared with 2.3 per cent in Detroit in table 6, for example, seems inconsistent with value added

CHART 2

Trends in Bank Debits and Power Sales, United States and Selected Areas, 1919-1945



† United States - 140 centers outside New York * National Bureau of Economic Research method
‡ United States - Small and large commercial power sales; Areas - Total industrial and commercial power sales
For trend limits, see footnote to Table 7 Logarithmic scale

trend percentages which are 1.7 per cent in both areas. This is due to a purely mechanical difference between the employment trends; the trend in San Francisco refers to the 1925–1945 period, whereas that in Detroit refers to the 1920–1945 period. In San Francisco, *Census of Manufactures* data reveal that the trend in industrial employment was distinctly downward between 1919 and 1925. Thus, the trend from 1925 onward has had a greater slope than would have been true had it not originated in 1925, a somewhat depressed year, and had it been influenced by the downward movement in the immediately preceding period. Although the Los Angeles trend begins in the same year, 1925, the tendency between 1919 and 1925 was as steeply upward as in later years. Thus, the 13.3 per cent value for Los Angeles in table 6 does not distort the picture.

A somewhat opposite distortion occurs in Chicago. Its employment trend in table 6 begins in a peak year, 1923, and though reference to manufacturing census data reveals that the downward distortion is not great, still it depresses the Chicago trend somewhat. Nonetheless, Chicago's value added trend had the lowest gradient, confirming and explaining in part its almost horizontal trend in industrial employment. Cleveland and Pittsburgh, like Chicago, grew slowly in manufacturing over the period, which undoubtedly depresses values for these areas as shown in table 6.

In connection with manufacturing growth, it is interesting to note that the marked differences between the regional trends in industrial employment, department store sales, and bank debits do not appear in industrial and commercial power sales. The values (table 6), in the latter instance, range from 5.5 per cent in San Francisco to 14.1 per cent in Los Angeles.[13] Even in Chicago the trend in industrial and commercial power sales slopes sharply upward. Positive trends in this series are to be expected in areas in which population and manufacturing are increasing, but another explanation must be added in order to account for positive power sales trends in those areas where such increase did not take place. The added factor, one of great significance, is the rapid pace of industrial electrification which occurred in this period. From the beginning of the century, cleanliness, speed, flexibility, and economy all led to the rapid substitution of electric power for other power sources. From 1919 to 1939, the horsepower of all electric motors utilized in American manufacturing tripled, whereas that of prime movers increased by less than 10 per cent.

Peculiarly, Cleveland's power sales trend approaches that of Los Angeles in steepness, yet, at the same time, other trends in Cleveland are low: value added by manufacture remained almost constant; popu-

[13] San Francisco's power series includes residential electricity sales. See appendix i, pp. 198–199.

lation growth was lowest or next lowest in both the 'twenties and the 'thirties; and in industrial employment, department store sales, and bank debits, the increase was likewise slow. Cleveland's electrification occurred at a faster rate than elsewhere; in Los Angeles, for example, there was a remarkable advance in manufacturing itself to support electrification as a basis for a rising trend. The reason for this unusually rapid electrification of industry in Cleveland lies in the character of its manufacturing operations, specialization in iron and steel products and in such steel-using industries as machinery and motor-vehicle parts; especially important is machine-tool manufacture. This general type of activity lends itself well to electrification and tends to draw more electric power than some others, such as apparel and leather manufacture or food processing, which rank high elsewhere.

Chicago reflects almost no upward long-run tendency in employment and store sales, and in power sales it lags behind all areas except San Francisco. In bank debits, however, Chicago assumes a growth which exceeds that of Pittsburgh and of San Francisco and approaches that of Cleveland although, in absolute amounts, debits in none of these areas increased rapidly. The Chicago Federal Reserve District, including both Chicago and Detroit, showed a persistent gain in relative importance from 1919 to 1929–1930,[14] whereas, over the same period, the city of Chicago itself grew substantially as a banking and financial center. In 1909 and in 1915, the value of shares traded on the Chicago exchange was less than 1 per cent of those traded on the New York exchange (0.4 per cent in 1915); in the years 1919, 1925, and 1929, this figure had risen to 2.3 per cent, 3.1 per cent, and finally to 7.3 per cent. Although the position of Chicago, relative to New York, declined thereafter, it never sank to its earlier level; Chicago's share of the trading outside New York continued at high levels. Combining this fact with substantial growth in the principal commodity exchanges provides ample explanation for Chicago's somewhat more favorable showing in bank debits as compared with the other series.

The preceding comments concerning the causes for the differences in the trends are by no means exhaustive. The fitted trends, however, are meant to be merely descriptive. For purposes of this study, far more important than attempts to explain or justify the fitted trends, are their effects on the timing, duration, and amplitude of cyclical variation.

The Effects of Trend Adjustment

Chart 2 presents two sets of trends for the six areas: trends in bank debits and in industrial and commercial power sales. They are the normal

[14] Cf. J. W. Angell, *The Behavior of Money* (New York, 1936), p. 68.

values utilized in the adjustment of the series before proceeding to the study of cyclical variation in succeeding chapters.[15] Similar trends have been computed for both the industrial employment series and the department store sales series.

CHART 3

Cycles in Bank Debits in Detroit, 1922-1938

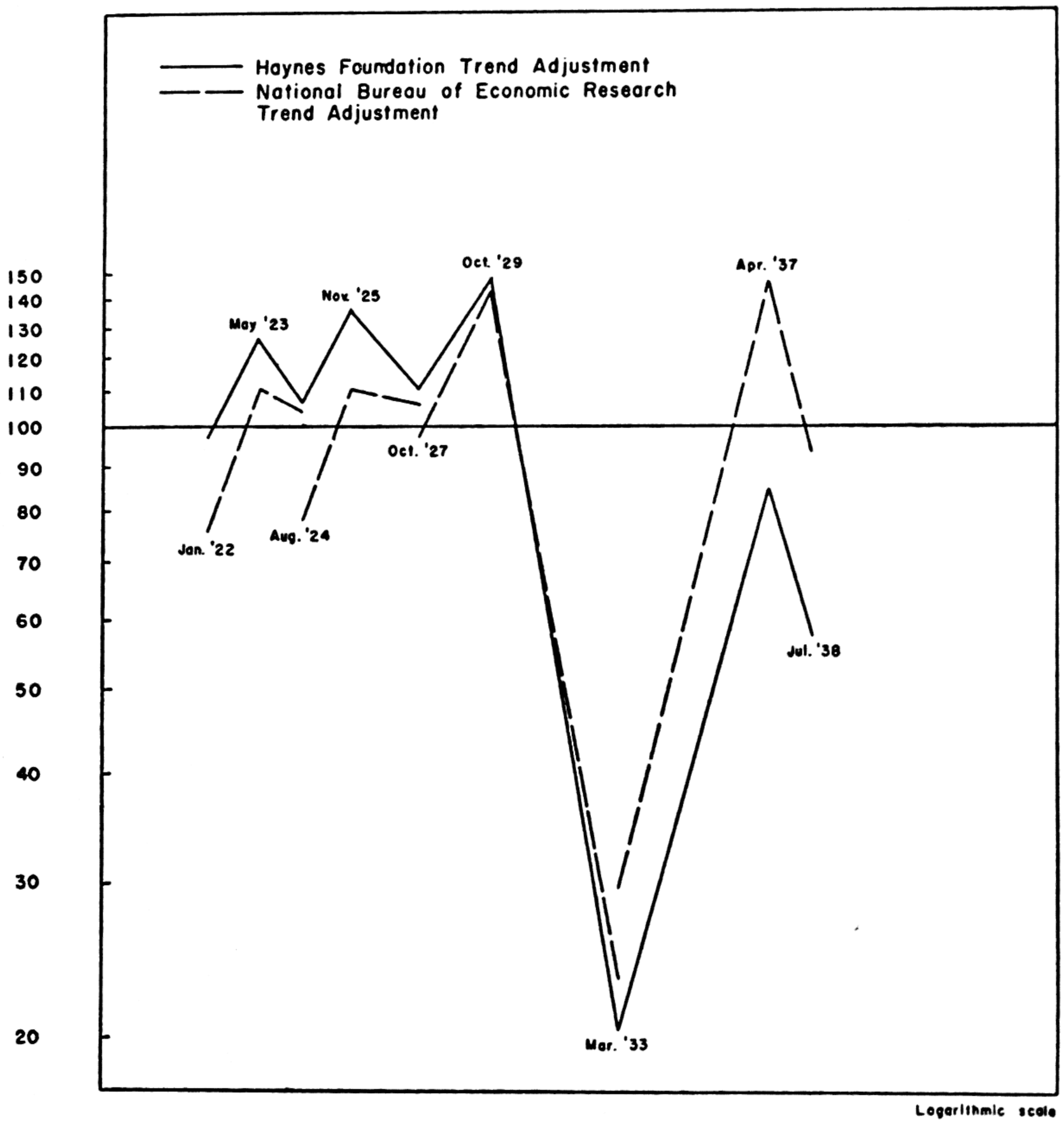


Chart 3 contains two series of the ratio of the index to trend in Detroit bank debits which differ, in that one represents the actual series divided by the straight-line trend fitted to the entire series, whereas the other represents the actual series divided by the average of these values lying within each cycle measured from trough to trough. This latter method is that utilized by the National Bureau of Economic Research.

The formulae for the trends utilized are presented in table 7. The

[15] See above, pp. 33, 34.

divergent rates of change reflected by these and by the data in table 6 and chart 2 may have important effects on the cycle measurements employed below.

Wherever the trend is sharply upward, even a slight falling off in a high rate of growth may cause a contraction in the adjusted series. Also, not only must the actual series increase, it must increase more rapidly than the trend in order that an expansion in the adjusted series may occur. Since, in most cyclical expansions, the rate of increase diminishes as the expansion approaches the peak and turning point, adjustment for upward trend will either leave the turning points unchanged or will advance the upper and delay the lower one.[16] Furthermore, recovery seldom proceeds at a constant rate from the turning point, but gathers momentum for a time, so that increasing trends may lead to a mechanically retarded recovery. This retardation is not improper, and if Los Angeles and Detroit should have uniformly longer downswings measured from upper to lower turning points, this cause should be recognized. The test made of the effect of trend adjustment on Detroit's bank debits (see chart 3) reveals, however, that adjustment left turning points unchanged.

If the trend is horizontal, an actual decrease in the series is required in order that the adjusted series turn downward. Also, any increase in the actual series will cause an upswing in the adjusted series.

With a downward-sloping trend, the actual series must decrease faster than the trend in order that the adjusted series turn downward, and decrease less rapidly to reflect an increase in the trend-adjusted data.

The cycle, measured from peak to peak or trough to trough, should not generally be either shorter or longer as a consequence of trend adjustment, since the changed duration of recovery is likely to be offset by an opposite change in the recession. It is possible, of course, that trend adjustment will eliminate or create minor cycles, for any differences in the rate of change between the trend and the unadjusted data may cause the adjusted series to move in a manner opposite to that in the unadjusted data. To illustrate, Burns and Mitchell observe that "under certain circumstances, a specific cycle will be lost when the secular trend is removed. Thus, if the trend is upward, a cycle will disappear in the adjusted data whenever the rate of rise during a cyclical expansion of the unadjusted data is no greater than the rate of rise of the fitted trend line during the corresponding period. Similarly, if the trend is downward, a specific cycle will disappear whenever the rate of decline of a cyclical contraction in the unadjusted data is no greater than the rate of decline of the trend."[17]

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[16] Burns and Mitchell, *op. cit.*, p. 277.
[17] *Ibid.*, p. 274.

Cycles will be created, with an upward trend, if the growth of the unadjusted series proceeds at rates alternately less or more than the rate of trend increase. With a declining trend, analogous deviations in the rate of decrease of the unadjusted data will create cycles.

Thus, since trend adjustment may both create and eliminate minor cycles, and because it can only re-time, but not eliminate, major ones in which the cyclical swing is large relative to the secular change, it seems safe to conclude that at least the duration of major cycles will not be affected by trend adjustments.[18] Also, since horizontal trends cannot create or eliminate cycles, series where deviations from the horizontal are greatest are more likely to be distorted by trend adjustment. In the adjusted data, if minor cycles should frequently appear in the Los Angeles and Detroit areas or, on the other hand, if minor cycles do not appear in these areas and they do appear in the others, these observations on the effects of trend may be relevant as partial explanations.

These effects of trend on upper and lower turning points, therefore, affect both the duration of the two major phases and the timing of the cycle. Areas of steep positive trends, such as Detroit and Los Angeles, should lead at the upper turning point and lag at the lower one; areas of milder positive trends, like Pittsburgh and San Francisco, may therefore display some tendency to lead at the lower and lag at the upper turning point. But consistent leads or lags that appear in certain areas must be investigated to determine whether or not there is a possibility that they are caused by trend adjustment.[19]

This adjustment is also likely to have important repercussions upon the amplitude of cyclical variation, with the specific effect depending upon the method by which cycles are measured. One method is to determine percentage changes from peak to succeeding trough and trough to peak, a technique which is obviously crude, for it cannot indicate the extent to which the particular peaks and troughs are representative. To illustrate, a downswing may involve a 10 per cent decline in the first few months, a relatively long period of stability at that level and then a further short, but sharp, decline to the trough, making the total decline 50 per cent. This figure badly misrepresents the amplitude of the decline since a high "shoulder" exists and thus the peaks and troughs are unrepresentative extremes. An opposite circumstance could well reduce the

[18] Conceivably the duration might be altered because of unequal mechanical shifting of the terminal peaks or troughs, but it is unlikely that such distortion would be either frequent or consistent.

[19] Burns and Mitchell found, for a number of test series which showed increasing trends, that in only one-third of all cases did a trend adjustment affect the turning points. Cf. Burns and Mitchell, *op. cit.*, pp. 277–278. If a "real" trend is established on any basis, then shortening or lengthening a cycle from adjustment or nonadjustment may be said to be "proper."

usefulness of percentage increases from trough to peak as a general measure of the amplitude of expansion.

So far as these percentages are enlightening, and since they will later be used merely as a first approximation in the measure of cycles, it is worth while to point out their reaction to trend adjustment. As indicated earlier, correction for upward trend may displace the turning points, advancing the peak and delaying the trough. This process places the peaks in months whose unadjusted values are below the maxima of the actuals, and puts the troughs in months whose values are above the minima. Therefore, when the trend is positive, this displacement may tend to understate both percentage increases from trough to peak and percentage decreases from peak to trough when compared to the same figures computed for the actual series. This effect, however, is likely to be hidden by another consequence of adjustment. Dividing the actual by the trend values, or sometimes subtracting the trend, so affects the adjusted values that it cannot be said, without knowledge of the direction of the trend, whether the percentage decline from upper to lower turning point, or vice versa, will be increased or decreased by adjustment. Some valid generalizations may be drawn, though, with respect to the relative effects of trends of different slope. A horizontal trend will leave the percentage change between turning points the same as in the unadjusted data. Once the trend has upward slope, the percentage changes are altered. The steeper the slope, the greater the violence done, for the greater is the difference in the percentage changes between the adjusted and unadjusted data. More specifically, the percentage decline from peak to trough increases as the steepness of the trend increases; contrarily, the increase from trough to peak decreases with an increasing trend gradient. Thus, in Detroit and Los Angeles, where sharp upward trends exist, the alteration in the amplitude of the cycle measured in this way from the amplitude before adjustment is likely to be greatest. Where trend is more nearly horizontal, the difference in amplitude between adjusted and unadjusted data would be extremely small. Results opposite to those obtained in adjustment for upward trend will occur for a downward trend.

At this point it is necessary to anticipate the more detailed discussions of cyclical measurements given later in order to discuss further the effect of trend adjustment upon amplitude. The pattern of a specific cycle may be measured in several ways. The National Bureau of Economic Research divides the entire cycle into nine periods, expressing the average monthly value in each period as a percentage of the average monthly value in the total cycle. Cycles may be readily compared by the study of the standing of these cycle "relatives." The average standing in each period "repre-

sents" the monthly values in the period, whereas the average for the cycle involves the use of a horizontal intracycle trend.[20]

In this study, the principal technique for the description and measurement of cyclical patterns involves the treatment of each cycle as a frequency distribution and the use of the usual measurements of central tendency and dispersion. The comparison of the measurements of the distribution of these values of the trend-adjusted data permits the ready comparison of the cycles which the series reflect for each area. Thus, if the mean of the values in a single cycle in Los Angeles is 85.0 and the coefficient of variation 10 per cent, whereas in Cleveland the measurements are 75.0 and 25 per cent, it is obvious which of the areas is in the most favorable position and approximately what the major differences are in the pattern of this specific cycle. The series themselves (appearing on the charts which follow throughout the text) are plotted on logarithmic scale and cover a number of cycles. Hence, the nature of the distribution is not apparent from an examination of the charts; their value is primarily in presenting comparative rates of change.

When an upward trend is removed from a time series, the effect is generally to reduce the upswing and to accentuate the downswing, so that the pattern of the cycle is substantially altered. Reference to the Detroit bank debits data of chart 3 illustrates this fairly well: one series is adjusted for a horizontal trend equal to the mean of the monthly values within each cycle, and the other is adjusted for an upward-sloping, straight-line trend. The adjusted values, together with the percentage changes for the peaks and troughs of four cycles, are presented in table 8. These percentage change figures clearly show this consequence of trend adjustment. A consistent difference does not reflect itself between the means of the adjusted series because of the possibility that the actual values within a single cycle can be either wholly below or wholly above the trend. It is unlikely, however, that the standard deviation (or any other measure of dispersion) will be greater for a series which has been adjusted for an upward-sloping trend than for a series with each value expressed as a percentage of the mean of the values. This is due to the fact that the upward trend owes its existence to the upward tendency of the data. It is true, of course, that the terminal peak of a single cycle may be lower than the previous upper turning point, but it is unlikely if the general trend of the entire series is upward. Only if the trend within the cycle is horizontal or downward will the dispersion of the series adjusted for the upward trend be greater than for the series adjusted for the intercycle trend alone.

Trend adjustment significantly affects the duration, timing, and ampli-

[20] *Ibid.*, pp. 144–160.

tude of cyclical variation, but it is not so important for the purposes of this study to know the precise consequences of any given types of adjustment as it is to be aware of the probable differential biases introduced by trends of different slopes. Remaining mindful of the limitations to the accuracy of the basic data and of the possibility of effects other than those to be expected on the basis of logic alone, it seems valid to conclude that trend adjustment for all the series is unlikely to distort significantly

TABLE 8

TURNING POINTS IN DETROIT BANK DEBITS, 1922–1938

	Turning-point date	Actual, adjusted for upward, straight-line trend	Percentage change from previous turning point	Actual, adjusted for intercycle trend only	Percentage change from previous turning point[a]
T	January, 1922	97.2	....	75.3	....
P	May, 1923	125.7	29.3	110.5	46.7
T	August, 1924	106.2	−15.5	104.2	−5.7
T	August, 1924	106.2	....	78.1	....
P	November, 1925	135.8	27.8	110.0	40.8
T	October, 1927	110.4	−18.7	106.0	−3.6
T	October, 1927	110.4	....	97.4	....
P	October, 1929	148.0	34.1	143.3	47.1
T	March, 1933	20.4	−86.2	23.5	−83.6
T	March, 1933	20.4	....	29.5	....
P	April, 1937	84.7	315.2	146.0	394.9
T	July, 1938	57.6	−39.1	93.4	−36.0

SOURCE: Derived from appendix ii.
[a] Turning points for both methods of adjustment coincide.

the cyclical picture emerging from the adjusted data. Whether no adjustment for trends or adjustment for intercycle trends, freehand trends, or fitted trends of any type is made, it is certain that trend (or lack of trend) affects the cycle in many ways. So long as all series are treated in a similar way, and so long as results are examined for possible bias, the different techniques for trend adjustment are likely to lead to similar conclusions.

SEASONAL VARIATION

The problem of removing seasonal variations is important because they fall outside the adopted definition of cyclical movement in their repetitive intra-annual pattern. Though statisticians find it convenient to treat the seasonal as an independent variable in time series, cyclical influences do affect seasonal variations, especially their amplitude during boom years

and depression years.[21] Also, the question of the method of segregating time series components is not solved, since a time series may be looked upon as either the sum or the product of its components.[22]

Most methods of seasonal adjustment immunize the seasonal index against irregular events rather successfully by excluding extreme items from the arrays which yield the monthly index values; cyclical components were excluded from the seasonal index both because the raw data were divided by a centered twelve-month moving average and because the adjusted monthly values were averaged to obtain it. Sometimes a trend is computed beforehand, and trend values are either deducted from the seasonal index or, as in the Falkner method,[23] divided into the original data in order to remove cyclical elements. In other cases, trend is removed after seasonal adjustment has been completed.

The choice of technique used in this study was guided primarily by the desire to make minimum initial commitments on trend and, at the same time, to eliminate, satisfactorily, trend and cycle from the seasonal measures. The option on trend was to be preserved, since trend is specifically one of the variables subject to detailed experiment and investigation. The ratio-to-moving-average method seems most satisfactory in answering the requirement, since there is no necessity for previous selection of trend periods and, therefore, no problems at this point associated with the question of trend continuity.[24] Furthermore, it yields a narrower range of ratios than does the Falkner method, because the norm is not a straight line, but a moving average, which follows the cyclical pattern in the original series. This method is also desirable mechanically, because it affords an easy means of observing the clustering of ratios which serves as *internal* evidence of discontinuities in the pattern or amplitude of the seasonal variation.[25] No continuous variation in either amplitude or pattern was observed from one specific seasonal to another, so that the use of moving seasonal indexes was not called for.[26]

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[21] S. Kuznets, *Seasonal Variations in Industry and Trade* (New York, National Bureau of Economic Research, 1933), p. 327.

[22] F. E. Croxton and D. J. Cowden, *Applied General Statistics* (New York, Prentice Hall, Inc., 1945), p. 469.

[23] H. D. Falkner, "The Measurement of Seasonal Variations," *Journal of the American Statistical Association*, June, 1924, pp. 167–179. For comments regarding the Falkner method, see Croxton and Cowden, *op. cit.*, pp. 469–471.

[24] Croxton and Cowden, *op. cit.*, p. 471, suggest that the trend period should coincide with the period of the seasonal measure. No reason is presented for this and, for some of the data processed in this study, such coincidence would decrease the validity of the adjustments.

[25] *External* evidence of seasonal breaks consists in actual information from business annals. An example is the change in the date of the appearance of new models in the automobile industry in 1935.

[26] A specific seasonal as opposed to the typical or average seasonal is the seasonal variation which actually occurs in any particular year. W. A. Neiswanger, *Elementary Statistical Methods* (New York, Macmillan, 1943), p. 547.

TABLE 9

PERIOD, RANGE, AND AVERAGE DEVIATION OF THE SEASONAL INDEX, FOUR SERIES, SIX AREAS

Area	Bank debits			Department store sales			Industrial and commercial power sales			Industrial employment		
	Seasonal period	Range	Average deviation	Seasonal period	Range	Average deviation	Seasonal period	Range	Average deviation	Seasonal period	Range	Average deviation
Los Angeles	1919–29	20.4	4.4	1919–29	75.2	10.5	1927–34	24.9	7.2	No seasonal adjustment		
	1930–45	16.0	3.3	1930–39	81.8	11.9	1935–45	14.3	4.5			
				1940–45	76.2	12.5						
San Francisco	1919–38	16.1	3.8	1919–28	90.2	14.7	1921–45	23.2	5.6	1925–34	9.4	2.3
	1939–45	23.5	4.6	1929–39	96.4	14.2				1935–45	18.1	4.5
				1940–45	80.0	14.1						
Chicago	1919–29	18.7	4.2	1923–29	102.1	16.8	1920–28	21.6	6.8	No seasonal adjustment		
	1930–39	28.6	5.6	1930–39	94.8	15.1	1929–37	13.3	4.4			
	1940–45	29.0	6.1	1940–45	91.7	15.2	1938–45	7.9	1.6			
Detroit	1919–29	18.5	3.3	1923–29	86.3	16.2	1920–30	23.9	5.4	1920–33	38.8	7.4
	1930–45	26.1	5.5	1930–39	96.4	19.4	1931–38	23.0	5.6	1934–40	38.2	9.9
				1940–45	74.0	15.9	1939–45	13.2	3.3	1941–45	4.2	0.7
Cleveland	1919–29	27.5	6.5	1919–27	80.2	14.7	1920–45	8.2	1.7	No seasonal adjustment		
	1930–39	31.1	5.3	1928–39	86.0	16.6						
	1940–45	36.7	5.7	1940–45	78.0	15.5						
Pittsburgh	1919–29	16.9	4.3	1920–28	82.8	14.9	1925–37	7.7	1.7	No seasonal adjustment		
	1930–39	29.4	5.8	1929–39	95.9	16.3	1938–45	7.5	2.0			
	1939–45	37.6	5.9	1940–45	88.9	14.9						

SOURCE: Derived from data in appendix iv.

The specific method used differs little from the usual procedure found in any textbook on statistics, so that it may be set down briefly. First, ratios of the original index values to a centered moving average are computed. Then the ratios are arrayed by months and inspected for signs of discontinuity revealed by a clustering of ratios for a number of adjacent years. The occurrence and extent of such uniform clusters furnish the basis on which the array is divided in order to compute seasonal indexes for various periods. These indexes consist of modified means, excluding the two extreme items in each period of the array and corrected so that the sum is equal to 1,200.

The selection of "seasonal periods" calls for further comment. Mindful of the conventional minimum limits of seven or eight years for a valid seasonal index, a problem arose because of the clear-cut bunching of ratios for four- or five-year periods, particularly during World War II.[27] If the usual method is followed, the average will obscure the divergence; but, if an exception is made, a better-fitting seasonal index might be obtained. The latter alternative is adopted here because the "internal" evidence is supported by "external" evidence (e.g., the years 1940 to 1945 were significantly different to justify such short seasonal periods). It may be mentioned in passing that the goodness of the seasonal adjustment was impaired in the terminal years of some series, because the specific seasonals for such years showed that they might belong to preceding or possibly to subsequent periods. To illustrate, the specific seasonals of some series for 1945 showed a considerable break from the war pattern, suggesting that they may be harbingers of a new postwar seasonal.[28]

These seasonal variations are the results of three groups of forces: climatic factors, the impact of customs and habits, and the peculiarities of the calendar. Calendar influences may be taken out of monthly or weekly data by an adjustment for working days, as in the department store sales index compiled by the Federal Reserve Board. Another type of mechanical disturbance affecting some data is exemplified by the year-to-year shift of the Easter holidays; this, as well as other distortions because of fixed holidays, can be adjusted by special techniques.[29]

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[27] Burns and Mitchell, *op. cit.*, p. 47.

[28] An ingenious, although highly subjective, method of seasonal adjustment that might deal with this difficulty is described by H. D. Barton, "Adjustment for Seasonal Variation," *Federal Reserve Bulletin*, June, 1941, pp. 518–526. The gain to the study from these adjustments was considered too small in relation to their laboriousness to make them worthwhile here. The probability of new postwar seasonal patterns is noted also by the Bureau of Business Research of the University of Pittsburgh (Letter to the Haynes Foundation, July 25, 1947).

[29] Cf. "Revised Index of Department Store Sales," reprinted from the *Federal Reserve Bulletin*, June, 1944, issued by the Board of Governors of the Federal Reserve System.

Considerations arising during the progress of the study suggested that seasonal variations, although a by-product, should be examined so far as they are associated with secular trend or with the cycles prevailing in the six areas. Seasonal variations differ in amplitude and pattern, both from series to series and from area to area; they also change, although slowly, over a period of years. For the most part, detailed description of seasonals will be confined to tables which appear in appendix iv and which present the indexes for each area by series. Also, for convenience, the seasonal periods, average deviations and the ranges appear in table 9. Any detailed discussion of the various seasonal indexes would necessarily be lengthy and will not be presented here, since this study is not primarily concerned with this problem. Instead, only generalized statements of the seasonal patterns and selected examples of important changes will be presented.

To give an idea of the different seasonal patterns in the four series of one area, the seasonal indexes computed for San Francisco are superimposed in chart 4. The lack of correlation between the seasonal patterns in any period is apparent at once. Although the annual level of industrial activity (as measured by industrial employment or industrial and commercial power sales and department store sales) correlates well with that of a more general business indicator such as bank debits, the bond between them on a monthly basis is found to be elastic. Bank debits seem to be unrelated to industrial activity, whereas the two measures of the latter (industrial and commercial power sales and industrial employment) vary inversely to each other.[30] The seasonal pattern of department store sales, in turn, seems unrelated to the industrial series and certainly is not closely associated even with bank debits, except in the last month of the year.

Regional Seasonal Differences by Series

The seasonal index of bank debits is a composite reflection of a variety of seasonal business experience. It is characteristic of such an index to have a narrower range than its component indexes; for example, those of debits that arise in the various branches of industry, trade, and agriculture offset troughs and peaks by their diverse timing. Similarly, we might expect the seasonal indexes of regional bank debits to be marked by a greater amplitude than the index of national bank debits and by an appreciable divergence in pattern.

An over-all picture of bank debit seasonals in the six regions (chart 4) reveals that the index starts close to the yearly normal, drops in February (partly because of the shortness of the month), reaches a spring

[30] It should be remembered, however, that the power sales series in San Francisco included residential electricity sales.

peak in March or April and a summer high in June or July. Thereafter, activity tends to fall below normal until October. November is uniformly slow, and December is usually the highest month. Examination shows that the range, as well as the average deviation of the indexes, increases with the onset of the depression in the 'thirties. This fact, largely owing to higher December values, may be attributed to a change in the distributive sector of the economy.

Some interesting changes and differences should be noted. In the 'twenties, Detroit is rather stable apart from a low February. A change occurred in the 1930–1945 period, when the spring months were high and the autumn months low, except for an extremly high December. This seems to be largely the consequence of changed seasonal in manufacturing and of the enormous increase of automobile production in the Detroit economy.[31] Also of interest is the fact that August and September or September and November (1930–1945) are the trough months in Los Angeles, whereas in nearly every other area the trough comes in February (chart 4). In Cleveland and Pittsburgh there is an accentuated December in the 'twenties which is associated with the increasing importance of bonus payments to industrial workers and to the wartime development of Christmas savings plans by banks. The June peak common to both is characteristic of other large, heavy manufacturing centers.[32]

Seasonal variations in department store sales are important because they reflect both cash and credit retail activity and are a fairly reliable index of income disposition throughout the year. The seasonal indexes calculated from the aggregate activities of the several departments of department stores (all different in seasonal pattern and amplitude), give indications of the existence of changes in consumption patterns, though they do not clearly reveal such changes.

The typical seasonal index of department store sales ascends from a low January to an active sales period in spring, which may occur at any time between March and June. The variance is sharp in the eastern regions, involving as much as a 50 per cent increase between January and the spring peak, but passes without much note in the western areas. July is consistently the summer trough, though it is not so accentuated in the West as in the East, whereas the recovery in August is uniformly greater in Los Angeles and San Francisco. In fact, August approaches normal in these areas.[33] September, October, and November are months of increasing activity which reaches a peak in December.

Several strong tendencies are noticeable in the six areas. With the

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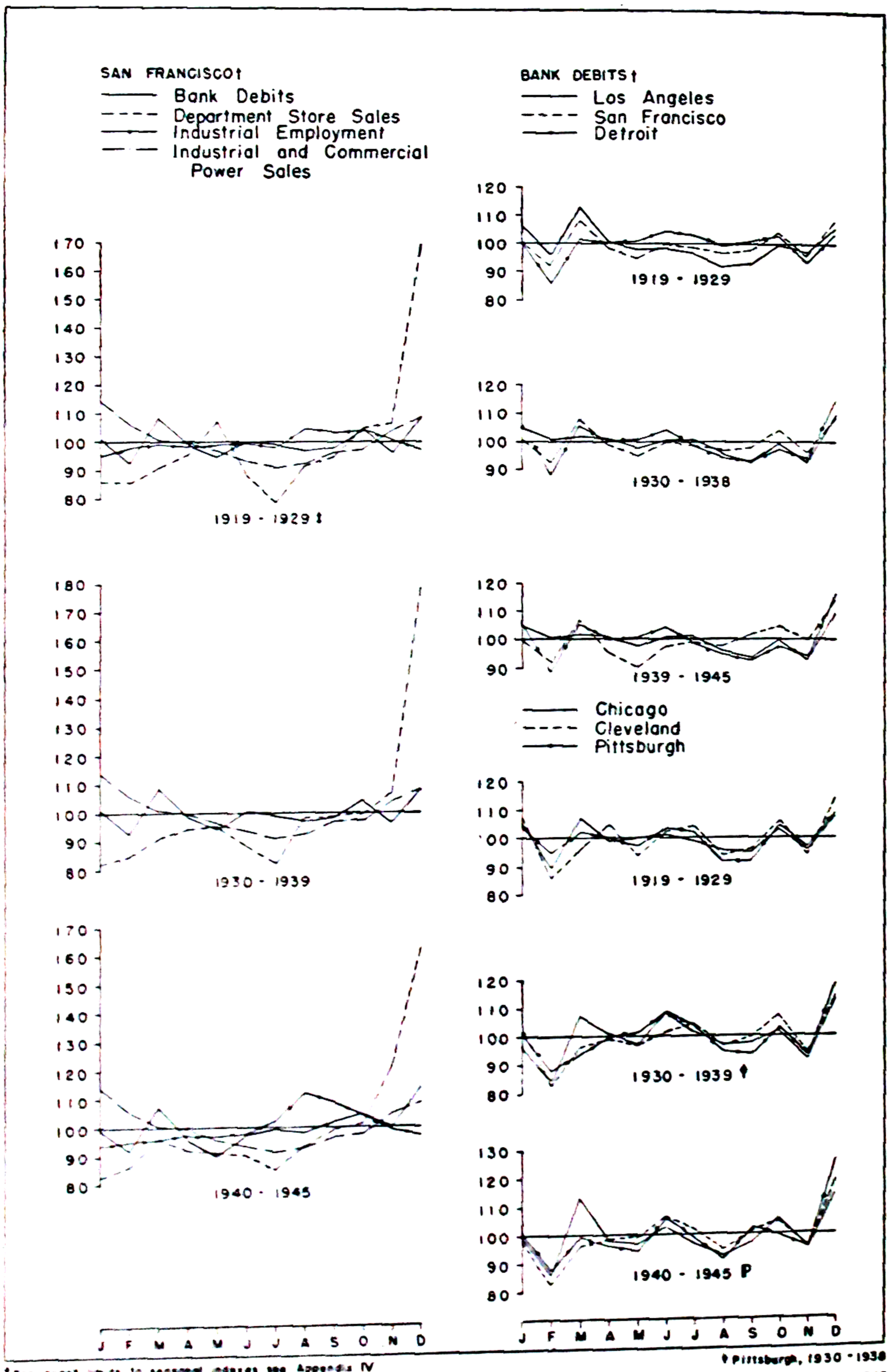
[31] Of total manufacturing employment, automobile production accounted for 63.7 per cent in 1940 in Detroit.

[32] Cf. Angell, *op. cit.*, p. 69.

[33] The normal referred to is the mean of the seasonal index, 100.

CHART 4

Selected Seasonal Indexes



† For exact limits to seasonal indexes see Appendix IV

‡ The seasonal periods in employment are 1925-1934 and 1935-1945. Therefore, no index for 1930-1939 is plotted

¶ Pittsburgh, 1930-1938

P Pittsburgh, 1939-1945

Arithmetic scale

onset of the depression, December becomes a relatively more important month for consumers' outlays and there is resistance to "depressed" Christmases, but, during the war years, December declined again in relative height. In all regions, except Chicago, the amplitude of the seasonals is greatest in the 'thirties, and the average deviation is usually high. During the war years, spring buying occurs earlier, and November takes an unprecedented share of the year's purchases because of attempts to anticipate accentuated Christmas shortages and because of increased consumer incomes. Except in Pittsburgh, the war years reveal the narrowest range between the lowest and highest index value. The reason for this is to be found in changing buying habits; hand-to-mouth buying, characteristic of depression years, naturally tends to accentuate seasonal peaks and troughs, whereas prosperity relaxes the necessity for delaying expenditures. In the high-income 'forties, purchases are well distributed throughout the year, and Christmas is anticipated in November shopping.

Cleveland's index displays remarkable similarity to that of Detroit. In Cleveland, the spring peak is more pronounced and the one in September somewhat less so, but, nonetheless, these two areas are more similar in seasonal pattern than even Los Angeles and San Francisco. However, the September peak, sharp during the 'thirties and the war years, is not apparent in the 'twenties, when the index from July to December rises steadily. Apparently, before 1930, the industrial linkage between Cleveland and Detroit was much weaker than in the later years.

The stability of the seasonal fluctuations in industrial and commercial power sales reflects the diversity of the industries that make up the demand, and the relative seasonal inelasticity of the demand for power compared to the demand for other factors of production. In the three regions where periodic changes in the seasonal variation were found (Los Angeles, Chicago, and Detroit), the fluctuation became less pronounced in later years, thereby reducing the burden to the utility companies arising from heavy peak loads. This is borne out by inspection of table 9 where, with a minor exception, both ranges and average deviations register a uniform decline.

The seasonal index of San Francisco is the notable exception to the power sales index patterns, with the exception of Detroit's index for the war period, which is similar to that of San Francisco. It is inverted, being high in January, sinking gradually to a trough in July, and then moving upward to a high in December, but this pattern is largely a consequence of accentuated residential demand in winter and depressed demand in summer. In Los Angeles and Chicago the series do not include residential sales; hence, their seasonal indexes are generally lower in winter than in

summer. The decided convex character of the seasonal index in Los Angeles and Chicago as compared with the marked concave pattern in San Francisco also is to be explained by differences in the character of the industrial demand for electricity. In Los Angeles, the monthly variations based directly upon climatic factors are small, whereas, typically, the industrial demand of rubber manufacture, petroleum refining, and ice manufacture, together with a summer agricultural pumping demand, is sufficient to lead to a summer peak in the seasonal index. Industry in San Francisco does not require large use of electric power.

In Detroit the seasonal index of power sales is unique, exhibiting the most widely different values. Its unique pattern stems solely from the predominance in the area of automobile and automobile-parts manufacture and to the fact that the monopolistic characteristics of the industry lead to more or less uniformity with respect to the dates of model changes. The sharp alteration in seasonal pattern in Detroit beginning in 1931 is a case in point, for thereafter a steady decline in the seasonal index between May and August occurred, whereas before 1931 the index held up fairly well until August. At the same time, monthly passenger car factory sales underwent a change of similar nature.[34]

Contrasted with the other areas, Cleveland and Pittsburgh have stable seasonal indexes of industrial and commercial power sales. In these two areas consumption of power is almost constant throughout the year. In this connection, it is worthwhile to recall the discussion of the trend in Cleveland's power consumption. The industries of Cleveland adapt themselves well to the use of electric power, so that, though little is used for lighting and heating during summer months, industrial requirements fill in the trough which might otherwise exist. In Pittsburgh a somewhat similar situation exists, for the steel industry exhibits a remarkably stable seasonal pattern which, when supplemented by heavy machine manufacture and a few others, provides an industrial demand adequate to fill the usual trough resulting from summer weather.[35]

In general, the employment series proved to be stable as far as seasonal variations were concerned; except for San Francisco and Detroit, there was no seasonal adjustment made. Detroit, however, presents an exceptionally interesting seasonal index. As pointed out in connection with power sales, a large proportion of the industrial employment in that area is in the automobile industry; consequently, its fluctuations affect em-

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[34] Automobile Manufacturers Association, *Passenger Car Factory Sales by Months to United States Domestic Market and Foreign Markets*, mimeographed, May, 1939.

[35] Pig-iron production in the Pittsburgh district (thousands of gross tons), averaged between 1919 and 1935, 517 in January; 524 in April; 468 in July; and 481 in October. Cf. Bureau of Business Research, University of Pittsburgh, *Industrial Databook for the Pittsburgh District* (Pittsburgh, 1936), p. 97.

ployment more than does any single industry in any other area. The seasonal pattern is rather unusual because of the changes in the retooling periods and because of the existence, especially in the early years, of a consumption concentration twice a year, in the spring and autumn.[36] Retooling causes especially short and sharp fluctuations, occurring in some years in the summer and in other years in the winter. This pattern varies from year to year and from factory to factory.

Because of this changing seasonal pattern in Detroit, it is difficult to choose the best seasonal periods and at the same time to include a sufficient number of years in the period (e.g., one year December is very low and the next year it is extremely high). As a result, some of the troughs (especially in December) can be eliminated, but only at the expense of creating some peaks. Thus, Detroit's employment is seasonally unstable from 1920 to 1940. With the advent of war, the seasonal pattern almost completely disappears and the range of the seasonal indexes decreases to 4.2. It is notable that the seasonal indexes in Detroit for employment are much like the indexes for power sales. Although the periods do not exactly coincide, and an August peak in power sales in the earliest period does not show in the index of employment, still, the similarity is sufficiently marked to lead again to the observation that Detroit's economy is governed by the automobile industry.

San Francisco, though altogether unlike Detroit, is the only other area where seasonal adjustment is required. Here, again, the specific cause is to be found in the industrial pattern of the area. Nondurable goods production, employing in 1940 more than one-half of total manufacturing employment, rises steadily to a peak in August, declines until January, and then rises again. This is largely because of food-processing operations which experience a summer and early fall rush and which employ roughly one-half of all nondurable goods workers.

Decisions with respect to the adjustment for seasonal variation are generally made on the basis of purely pragmatic considerations. Series that have been corrected for seasonal change are not the series as they would have been in the absence of all seasonal forces.[37] Seasonal variation may well obscure cyclical turning points, and may even have sufficient influence to distort measures of cyclical amplitude. Indeed, logic suggests that there may be a different seasonal pattern in depression from that in prosperity and, hence, makes unadjusted data misleading. During cyclical declines, manufacturers and dealers are faced with an unstable demand as a result of "hand-to-mouth buying." They, therefore, allow their own operations to fluctuate with no incentive to produce for stock

[36] For more detailed information on this subject, see Kuznets, *op. cit.*, pp. 123–128.
[37] *Ibid.*, pp. 336, 337.

or to hold large inventories in anticipation of price increase. Because of the fact that the central purpose of this study is the examination and comparison of cycles in specific industrial areas, and because of the strong evidence that seasonality differs between the areas so that differential distortion would result, adjustments were made. All series have been adjusted wherever seasonal variations seemed to justify it.

CHAPTER III

THE TIMING AND DURATION OF REGIONAL BUSINESS CYCLES

CYCLES IN THE several areas may differ in many respects: in the dates of the upper and lower turning points, in the total duration of the cycles, in the duration of specific phases, in the amplitude of the cycles, and in the rates of change characteristic of the phases and of given periods within them. This chapter is concerned with the first two of these differences, which, because of their close causal relationship, must be considered together. There are, however, difficulties of an expository nature which preclude a completely integrated examination of these two aspects of cyclical change throughout the entire discussion. The cycles of this study are too complex to permit simultaneous study of all the aspects. Therefore, what might be referred to as the general theory of timing and duration will be treated first and separately; this discussion will be followed by an examination of the timing of turning points in the areas; and finally, a summary of average duration and conclusions concerning duration and timing will be presented.

THE TIMING OF REGIONAL CYCLES

The turning points of specific cycles arrive as a result of a conjuncture of circumstances associated with accidental (episodic) factors and with the process of expansion and contraction in varying degrees. Hence, they may be described as either exogenous or endogenous or both in character. Whatever the cause or causes of turning points, they are transmitted from the point or points of origin through the economy in what appears to be two directions. First, they are carried through the economic structure from the origin, vulnerable segments, to more rigid elements in the economy by a myriad of interindustry relationships; every economic activity is related to others, for each is dependent on others for materials or services or for markets. Second, the forces responsible for the cyclical downturn and upturn move geographically, primarily because geographic specialization exists and because activity concentrated in any given area may be either generally vulnerable or generally rigid. The basis for the transmission of an impetus to recovery or recession is to be found in interindustry ties, even though superficial observation may lead to the observance of purely geographic movement.

Though the mechanics of transmission are obvious, factual studies of the process, and particularly of the specific relationships, are few. An original and interesting quantitative study of these relationships is to

be found in *Inter-Industry Relations, 1939*, published by the Bureau of Labor Statistics of the United States Department of Labor in 1945. Many studies, not aimed directly at describing and measuring these relationships, by implication prove their importance, for the theory of the transmission process itself forms the foundation of every major attempt to develop an explanation of the business cycle.

One of the most comprehensive discussions combining the statistical examination of the sequence of cyclical changes between various industry groups and an examination of the causes for the sequence is that of J. M. Clark in *Strategic Factors in Business Cycles*.[1] The rationalization of the sequences is based generally upon the familiar principle of derived demand, upon such phenomena as differential durability of goods, alterations in inventories, whether goods and services are luxuries or necessities, and the influences of speculative operations. The net results of these forces lead Professor Clark to the following conclusions:[2]

1) Between goods of similar durability, consumers' goods move more promptly.[3]
2) Between goods of varying durability, the more durable move more promptly.
3) Construction contracts lead other activities substantially.
4) Automobiles, especially passenger cars, show a lead.
5) Production of consumer goods leads sales for consumption.
6) There is some indication that wholesale leads retail trade.
7) Between the same goods at different stages of production and distribution, the goods at the earlier stages (farther from consumption) seem to lead.
8) Physical output series appear to lead price series by a small amount at the peak.

On the basis of these general conclusions and upon the information about the economy of the six areas developed in chapter i, a number of timing differentials in the areas might well be anticipated. First, the eastern areas, especially Pittsburgh, Cleveland, and Detroit, because of concentration in durable goods production, should show some tendency to lead the other areas. Detroit, producing a durable consumers' good, automobiles, should reach turning points especially early. Pittsburgh, specializing in durable goods at early stages of production, should also show early turning points. Second, Chicago, Los Angeles, and San Francisco, where nondurable goods are relatively more important, should show some tendency to lag behind; though to the extent that nondurable

[1] J. M. Clark, *Strategic Factors in Business Cycles* (New York, National Bureau of Economic Research, 1935), pp. 23–73.

[2] *Ibid.*, pp. 71–73. These conclusions are based upon data unadjusted for trend. The final effect of trend adjustment on timing, however, usually seems to be reasonably small; tests of the National Bureau indicate that in approximately two-thirds of the turning points examined, adjustment did not affect timing. See Burns and Mitchell, *Measuring Business Cycles*, pp. 277–278. See also above, pp. 41–42.

[3] The apparent inconsistency of this conclusion and item 7 is probably due to the specific data included in the composite series examined by Clark. In general, it would seem as if conclusion 7 is more valid than conclusion 1.

goods are consumers' goods, this would offset or decrease the lag. Third, in areas where construction is relatively important, particularly Los Angeles, the turning point should appear earlier to the extent that construction colors business conditions generally. Finally, in areas where trade and service activities rank high, some lag should be expected, since, ordinarily, consumer buying moves downward or upward somewhat later than those activities associated with physical production. This consideration, therefore, might contribute toward a lag in such areas as Los Angeles.

The Duration of Regional Cycles

The essence of duration is a time span of a particular magnitude with variable original and terminal dates, involving continuity, not discrete points, as in timing. The duration of the cycles which the series in the various areas reflect can be said to result generally from combinations of the same forces that establish particular timing. Thus, differences in durability, in the extent to which emphasis is upon consumers' goods as opposed to producers' goods, and in the relative importance of such industries as automobiles and construction, all are important factors, but of fundamental importance is the rate of growth of manufacturing and of population in the area involved. This separate discussion, however, is necessary for a number of reasons.

First, though two areas may reach peaks and troughs at the same time, the duration of their cycles may be different. For example, area A may have peaks in 1923 and 1929 with one intervening trough, and area B may have peaks in 1923 and 1929 with an additional intervening peak and two intervening troughs. Such situations are not unusual and obviously significantly affect the duration of cycles, however measured. Examples of this are Chicago and Detroit bank debits between 1923 and 1929 or their power sales series in the same period (chart 6, p. 70).[4]

Second, areas may have cycles of much the same duration, and even with cyclical phases of approximately equal duration, but at the same time the turning-point dates may be different. If, for example, each turning point in area A lags one year behind those in area B, the duration of the cycle and its phases will be the same in each, whereas timing will be significantly different. An example of such a situation is found in employment in Detroit and Cleveland between the peak in late 1922 or early 1923 and the trough in 1933 (chart 6, p. 70). Though perfect regularity of lead or lag is not existent in this case, it is obvious that the durations are nearer alike than might be suspected from the consideration of the timing alone.

[4] The ends of the bars in Charts 6 and 7 are indefinite because no turning points could be established at these dates. The initial and terminal phases, therefore, represent parts of longer phases.

Third, though the causes for differences in timing are likely to be those which account for different durations, it does not necessarily follow that the specific effect upon duration can be foreseen from a knowledge of the effect upon timing. In fact, the principal causes for a given duration must bear upon the dating of the initial and terminal turning points; therefore, two sets of causes account for a given duration, but only one is responsible for either the upturn or the downturn.

The effects of growth on turning points and especially on the span between them is a particularly important factor in any investigation of duration. Nonrecurrent phenomena may displace single turning points and, therefore, though they bear upon duration, they may more properly be considered timing determinants. On the other hand, growth is likely to affect the position of turning points in a consistent manner and, therefore, may be looked upon as a basic determinant of duration.

Growth permits relatively easy absorption of new ideas and techniques, for all additions to plant can incorporate these new methods and liquidation need not always precede their introduction. In general, this should permit those areas favored by growth to gain at the expense of others as competition for markets in the later phases of the upswings and of recessions grows stronger. Stability or decline, on the other hand, makes the introduction of cost-saving innovations a difficult procedure, or else a very slow one, since the liquidation of outdated methods, machines, and plants must precede the absorption of new techniques.[5] Thus, in areas where manufacturing growth is rapid, the upper turning point should be delayed, whereas the unusual depression of costs in the downswing should hasten the lower turning point. Therefore, the upswing should be lengthened by growth and the downswing shortened. It should be noted that these effects are opposite, and thus are offsets, to those mechanical effects of trend adjustment discussed in chapter ii.

However, even in areas where growth has been substantial over a long period, it does not proceed steadily but at different rates. Typically, in spite of a sharp growth trend, recessions are accompanied by a decline in manufacturing rather than steady growth. For example, value added by manufacture declined in Detroit between 1919 and 1921 by 45 per cent, whereas in Chicago, an area growing very slowly, it declined only 18 per cent. Again between 1925 and 1927, 1929 and 1931, 1931 and 1933, and 1937 and 1939, Detroit's manufacturing declined. Easy adjustment to new cost-saving techniques does not exist in downswings to the same extent as during recovery. Therefore, the shortening of the recession is much less likely than is the lengthening of the upswing.

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[5] The existence of competitive conditions might well force the adoption of new techniques regardless of cost, or the loss from liquidation might be less than the saving effected by the new methods.

In somewhat the same way, population growth is likely to lengthen the cycle, for such growth in a cyclical upswing tends to be somewhat more rapid than in a downswing. Labor costs, or more particularly wage rates, therefore, should not rise as rapidly as they otherwise would and should prolong prosperity. In the downward phase, population growth slackens so that some of the depressing effect on costs, and the consequent stimulus to recovery, is lost. It is, therefore, more likely that population growth will prolong the duration of the expansion rather than contract the recession, so that the over-all duration of the cycle will be extended.[6]

Population growth for another reason may lessen cyclical severity, if not alter duration. A high rate of population growth in any area is likely to be associated with somewhat unusual patterns of resource combination in all business enterprises. Particularly, there will be a tendency for the proportion of labor as compared with capital utilized to be comparatively high, even in industries where fixed costs are important. This is just another consequence of relatively low labor costs as compared with the cost of other resources. In such areas, adjustments to expanding or contracting markets will not be made through less or more intensive use of "fixed factors," but are likely to be made more rapidly and with greater precision through the employment of varying amounts of labor. In those areas using relatively more labor, cycles, as measured by employment, are likely to turn downward earlier. Other series also, so far as their fluctuations follow those of employment closely, should react in the same way. A long depression permits reductions in fixed costs, but a short recession does not. In longer ones, because of such reductions, wherever the labor factor is relatively more important, the upturn is likely to come earlier. In shorter recessions this result is less certain, because fixed costs cannot be reduced. Heavier losses of producers, where fixed costs are relatively more important, may lead to attempts to anticipate the upturn and, therefore, may cause their employment to move upward earlier than it will elsewhere. Thus, conditions leading to relatively heavy use of labor may well affect timing and duration of cycles, acting differently on turning points according to the length of the preceding phase of the cycle and the extent to which anticipations enter into business decisions.[7]

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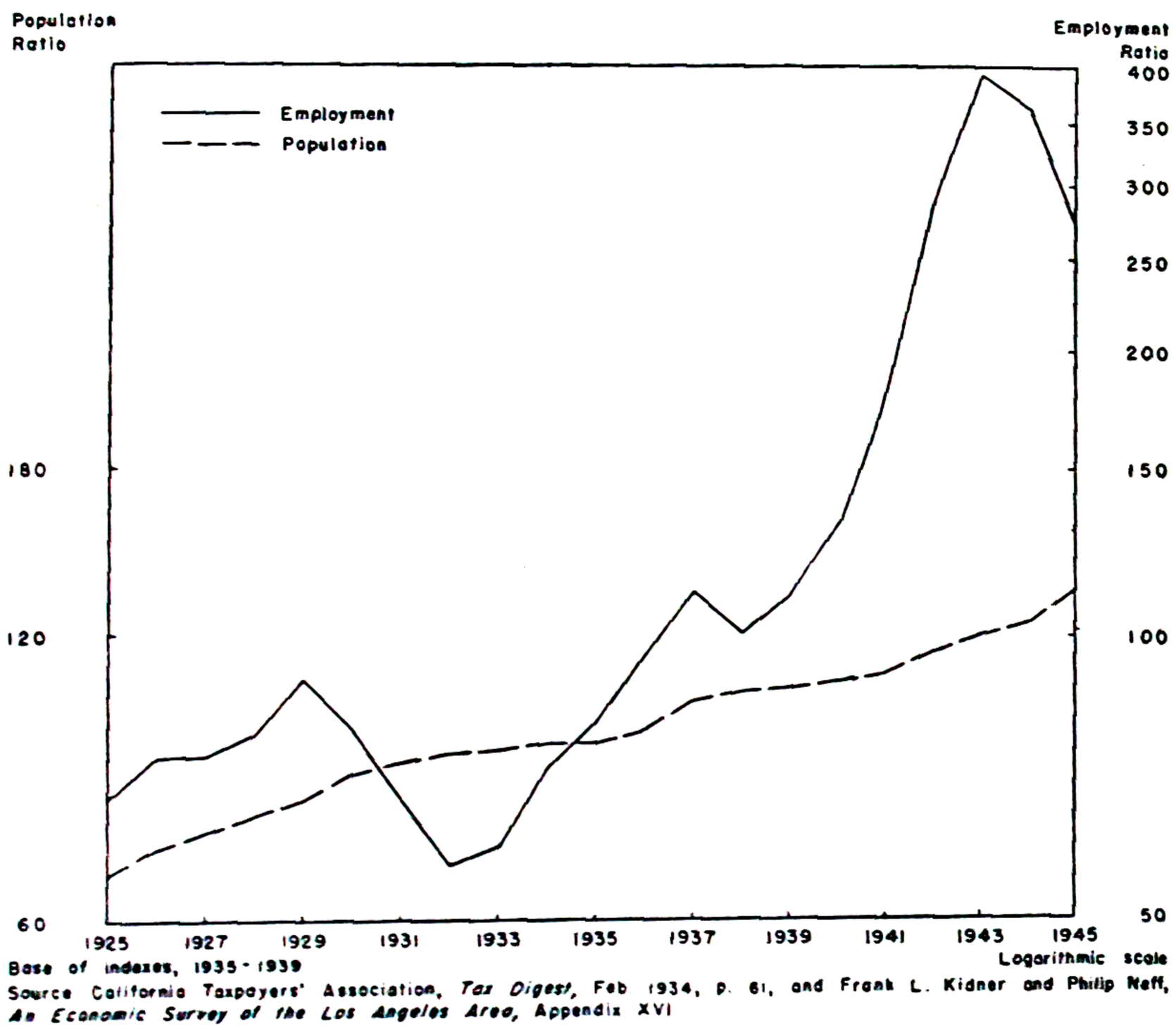
[6] The migration factor in cyclical fluctuation is explored rather fully in *Migration and Business Cycles* by Harry Jerome (New York, 1926). The study does not attempt to analyze the particular effect of migration discussed above, nor the effect on small areas. Jerome does note the possibility that the reaction of migration on wage costs "has been a factor in increasing the intensity of boom periods and consequently the severity of the subsequent depression" (p. 242).

[7] Another possible consequence of heavy labor utilization arises from the fact that total incomes created from such variable cost business enterprises will tend to decline more than will those in areas where fixed costs are heavy. The reason for this is that fixed cost payments, creating income, do not decline in depressions so rapidly as do

Chart 5 presents two indexes, one of factory employment and the second of population, in Los Angeles from 1925 to 1945. These indexes lend support to this position, for they show more rapid growth in population in periods when employment is increasing than when employment is falling off. The increase or decrease in the rate of population growth

CHART 5

Indexes of Manufacturing Employment and Population, Los Angeles, 1925-1945



Base of indexes, 1935-1939

Source California Taxpayers' Association, *Tax Digest*, Feb 1934, p. 61, and Frank L. Kidner and Philip Neff, *An Economic Survey of the Los Angeles Area*, Appendix XVI

seems to lag about one year behind the change in the employment series, but a significant difference in the rate of population growth between prosperous and depressed times exists. If data were available for all areas, the support of the proposition (the lengthening effect of growth on cycles is likely to be stronger than the shortening effect; hence, population growth tends to lengthen cycles) would undoubtedly be even stronger. The Los Angeles data do not provide conclusive evidence, however, because population continued to increase in California in the face of falling employment.

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variable cost payments. Thus, effective demand will tend to fall more in areas in which variable cost industries predominate, so that measures other than employment (e.g., store sales) will move more rapidly, or more closely with employment.

Some material bearing upon the growth of the areas was presented in chapter i, but more detailed statistics may be useful at this point. Table 10 presents data on population increases since 1870, and table 11 presents

TABLE 10

POPULATION INCREASE IN SELECTED INDUSTRIAL AREAS, 1870–1940
(Per cent per decade)

Area	1870–1880	1880–1890	1890–1900	1900–1910	1910–1920	1920–1930	1930–1940
Los Angeles	118.1	203.9	67.9	196.0	85.8	135.8	26.1
San Francisco	68.3	30.4	20.8	43.9	29.8	34.9	8.1
Chicago	57.9	82.5	50.6	31.5	27.9	32.8	3.2
Detroit	30.1	43.5	31.9	47.7	118.1	65.7	8.1
Cleveland	43.2	50.7	41.0	44.4	44.9	26.7	1.5
Pittsburgh	30.4	48.6	30.3	43.8	19.6	15.0	2.9

SOURCE: Philip Neff, Lisette C. Baum, Grace E. Heilman, *Production Cost Trends in Selected Industrial Areas* (Berkeley, 1948). p. 14.

TABLE 11

INDEX OF VALUE ADDED BY MANUFACTURE IN SELECTED INDUSTRIAL AREAS, 1899–1939
(1899 = 100)

Year	Los Angeles	San Francisco	Chicago	Detroit	Cleveland	Pittsburgh
1899	100.0	100.0	100.0	100.0	100.0	100.0
1904	245.0	152.2	128.2	151.6	125.3	117.8
1909	481.2	198.2	173.8	294.3	210.7	148.0
1914	776.2	263.2	217.0	614.7	267.2	160.5
1919	2,490.0	716.9	502.3	2,013.6	849.9	442.0
1921	2,755.0	540.7	411.6	1,106.7	521.8	242.1
1923	3,790.9	722.8	565.1	2,022.0	875.5	442.9
1925	4,730.3	713.1	617.8	2,315.3	860.4	394.2
1927	5,678.1	786.6	646.2	2,178.1	836.9	382.1
1929	7,612.1	941.3	766.4	2,588.7	1,081.1	471.2
1931	4,453.7	736.7	440.1	1,556.4	522.9	219.1
1933	3,190.2	508.2	312.0	1,185.9	374.6	141.6
1935	4,720.9	745.1	455.5	2,150.4	575.7	237.3
1937	6,437.8	861.1	627.0	2,859.3	782.9	417.4
1939	7,595.3	1,122.8	663.4	2,690.3	908.1	403.5

SOURCE: Philip Neff, Lisette C. Baum, Grace E. Heilman, *Production Cost Trends in Selected Industrial Areas* (Berkeley, 1948), p. 16.

indexes of value added since 1899 in each area. These data show clearly that, in terms of growth of population and of increase in manufacturing, Pittsburgh is without question the most mature area, whereas Los Angeles and Detroit are in earlier stages. San Francisco is in an early

stage of development in terms of concentration in manufacturing, whereas, in terms of growth, it is certainly well within the "middle-aged" bracket. Chicago and Pittsburgh are both definitely "older" than San Francisco and Cleveland.

The effects of growth should, for example, lead to the following duration characteristics: Pittsburgh, with heavy concentration in manufacturing and very slow increase in population as well as in manufacturing, should have long cycles. Los Angeles, the area growing most rapidly and with the smallest concentration in manufacturing, should have short cycles.

The Effects of Trend Adjustment on Timing and Duration

The mechanics of trend adjustment may affect duration substantially, for a steep trend tends to shift upper turning points backward and lower ones forward. Explanation of this mechanical shifting of turning points was given in chapter ii, pages 40–43, but an examination of the probable effects on the series utilized in this study was deferred. Such an inquiry is necessary here, since any mechanical shifting of turning points will obscure the effects of more basic causes for divergences in timing and duration. This effect of trend adjustment must be considered series by series, since trend slope may differ between the series within a single area and between areas in a single series.

The bank debit trends in Los Angeles and Detroit are very steep, as reference to chart 2 and table 6 will show. By the method of comparison employed in that table, they are more than twice as steep as the trends in the remaining areas. Detroit's trend is somewhat sharper than that of Los Angeles, but examination of adjusted and unadjusted data (chart 3) reveals that in Detroit the turning points were not displaced, and therefore duration was unaffected. Since the trend in debits in Los Angeles is less steep, it is likely that its timing and duration too are unaffected.

Trends in department store sales in the areas (table 6) are generally lower than in debits, so that again the possibility of a mechanical shifting is small. Of the areas, Los Angeles, San Francisco, and Detroit have the steepest trends, and if a displacement of turning points occurs, and contractions are lengthened at the expense of expansions, it is likely to be in these areas.

Probabilities of mechanical distortions because of trend in employment are extremely difficult to establish because of the shortcomings of the data. Computed trends are steepest in the two western areas, but this is due in large part to the period over which they were fitted. However, other sources, such as census data, suggest that, even if data to 1919 were available, their trends would still be steeper than in the eastern

centers. In the eastern areas, Detroit's trend is steepest, but even here the slope is not steep enough to make a mechanical distortion likely. In the western areas, the identifiable cycles are so few, but so pronounced, that shifting is unlikely; still the possibility should be examined at a later point when the data are available.

In power sales, all trends are very sharply upward, but the only one which differs substantially from the others (Los Angeles) is even more sharply upward. Its trend period largely accounts for this differential. Because all slopes are steep, all are likely to be distorted in the same way, if indeed they are affected at all, so that relative timing and duration as measured by adjusted power sales will yield a valid picture. The possibility of such shifting, however, should be considered when the four series for each area are compared.

The Timing of Area Cycles: General Statement

Table 12 presents data bearing on the timing of business cycles as measured by bank debits in the six areas examined and in the United States. The series for the nation is utilized merely as a bench mark from which to measure the timing in the areas; it has been processed in precisely the same way as the series for the areas and represents bank debits in 140 centers outside New York. On the average, Cleveland and Los Angeles resemble the United States in timing, since the average deviation (in months) of the turning points in these areas from comparable turning point dates in the nation is zero. On the other hand, Chicago generally appears to lead substantially, whereas the only area displaying any lag at all is Pittsburgh. Though at this stage it is unwise to draw generalized conclusions, the fact that only one area seems to lag behind the nation may be significant. Particular care must be exercised, since the average deviation (the total deviation in months in each area from the national turning-point date divided by the number of national turning points which in this case is six) conceals the magnitude of the individual items, and since to this point only one series and six turning points have been examined.

The total of the deviations, signs ignored, yields some indication of the magnitude of the timing differentials, whereas a comparison of total months of lead (−) with lag (+) will support the evidence of the average. In comparing the six areas, it seems that the greatest differences occur in Los Angeles, where two points differ from the nation by nine and eleven months, and the sum of the monthly deviations is twenty-four. The total deviations in San Francisco are fewest (six) and its maximum single deviation is two months, but it has a total of four months' lead as compared with only two months' lag. These supplementary measures

TABLE 12

TURNING POINTS IN BANK DEBITS IN SELECTED AREAS AND IN THE UNITED STATES, LEADS (−) OR LAGS (+)

United States	Los Angeles		San Francisco		Chicago		Detroit		Cleveland		Pittsburgh	
Turning points (date)	Turning points (date)	Lead or lag (months)	Turning points (date)	Lead or lag (months)	Turning points (date)	Lead or lag (months)	Turning points (date)	Lead or lag (months)	Turning points (date)	Lead or lag (months)	Turning points (date)	Lead or lag (months)
6/20 P	8/20 P	+ 2	6/20 P	0	8/20 P	+2	2/20 P	−4	8/20 P	+2	11/20 P	+5
2/22 T	3/21 T	−11	3/22 T	+1	6/21 T	−8	1/22 T	−1	9/21 T	−5	2/22 T	0
....	2/24 P	...	3/26 P	...	3/23 P	...	5/23 P	...	5/23 P	...	1/23 P	...
....	8/24 P	...	11/26 T	...	9/23 T	...	8/24 T	...	7/24 T	...	10/24 T	...
....	....	...	5/28 P	...	....	...	11/25 P	...	....	...	5/27 P	...
....	....	...	5/29 T	...	....	...	10/27 T	...	....	...	11/27 T	...
9/29 P	9/29 P	0	10/29 P	+1	9/29 P	0	10/29 P	+1	9/29 P	0	10/29 P	+1
4/33 T	3/33 T	−1	3/33 T	−1	12/32 T	−4	3/33 T	−1	5/33 T	+1	11/32 T	−5
3/37 P	4/37 P	+1	1/37 P	−2	1/37 P	−2	4/37 P	+1	4/37 P	+1	4/37 P	+1
6/38 T	3/39 T	+9	5/38 T	−1	6/38 T	0	7/38 T	+1	7/38 T	+1	6/38 T	0
....	....	...	....	...	1/40 P	...	10/43 P	...	7/44 P	...	5/45 P	...
....	....	...	....	...	8/40 T	...	....	...	....	...	....	...
Average lead or lag...	0	....	−0.3	....	− 2.0	....	−0.5	....	0	....	+0.3	
Total, signs ignored...	24	....	6	....	16	....	9	....	10	....	12	
Total, positive values (lags).....	+12	....	+2	....	+ 2	....	+3	....	+5	....	+7	
Total, negative values (leads).....	−12	....	−4	....	−14	....	−6	....	−5	....	−5	

SOURCE: Derived from data in appendix ii.

support the evidence of the average deviation with respect to Chicago's lead. Total deviations are relatively great in Chicago; fourteen months of sixteen are leads. In Cleveland and Pittsburgh, the total deviation is moderate, and the total months' lead is largely offset by lagging months.

General conclusions based upon table 12 might be summarized as follows: though, in Los Angeles, the timing of bank debits differs substantially from that of the nation as a whole, this evidence indicates that neither a consistent lead nor lag exists; San Francisco's debits reflect a timing similar to the nation; Chicago's debits show a decided, but not consistent, lead over the nation, and Detroit seems to resemble San Francisco closely; the leads and lags of Cleveland's debits exactly offset each other; and Pittsburgh shows a slight tendency to lag behind the nation and, hence, behind the other areas. Fewness of observations requires that these conclusions be accepted only tentatively; the existence in all areas of marked peaks and troughs not reflected in the national data makes the foregoing treatment, at best, somewhat crude.

The problem of this chapter is not, however, one of measuring and describing the differences between timing or duration in the areas and in the nation, but rather of discovering, measuring, and explaining differences between the areas. Therefore, a more detailed study of interarea differences is in order.

The same forces bringing about the divergence in turning points also account for important variations in duration. A statement of particular differences in total duration or that of individual phases is unnecessary, for these derive directly from the timing of turning points and associated causes. Some method of summarizing data on duration would be helpful, however, for the detail is so complex that any underlying regularities are hidden by it. Table 24 (p. 93) provides one method of summarizing this material and will be presented following the chronology of turning points.

Any study of the timing and duration of cycles in the several areas is complicated by the fact that there is sufficient diversity to make the establishment of comparable cycles difficult or even impossible. For example, in bank debits, the trend-adjusted data in all areas reflect a trough in either 1921 or in the early months of 1922. However, when Cleveland, Chicago, Detroit, and Pittsburgh reached upper turning points in early 1923, Los Angeles continued upward until February, 1924, and San Francisco until March, 1926. Before the last date, Detroit had experienced a full cycle, a peak in 1923, a trough in 1924, and a peak again in 1925. Under these circumstances the legitimacy of a comparison between San Francisco and Detroit, Los Angeles and Detroit, or Los Angeles and San Francisco is open to question. The problem, it is true, becomes less difficult with the 1929–1937 cycle, for then there existed

substantial similarity. This similarity may or may not continue; nonetheless, there is evidence in the period after 1937 of a complexity paralleling that of the 1920 decade. The existence of this difficulty is not without its blessings, for diversity of cyclical reaction in the areas was anticipated, and it is in this complex picture that the existence of an orderly pattern is to be found, if it exists at all.

A Chronology of Turning Points

Table 13 presents for each area and series a ranking of turning points. The points included were selected as comparable ones by the rule employed in this work (when they appear in three or more areas and when the spread at a peak or trough between one area and the one immediately preceding or following it does not exceed fifteen months). The turning points were ranked, and the ranking divided into three groups. Areas ranking above three were placed in the first group, areas below three in the third group, and areas which might be in either the first or third because of ties were placed in the second group. Table 13 shows that in employment and power sales, Detroit tends to lead, but in bank debits no lead in Detroit is evident. This is understandable in view of the fact that a durable consumers' good, automobiles, is by far the most important industry in that city. On the other hand, Chicago shows a tendency to lag in employment and power sales, and in this connection it is interesting to note that, in this area, nondurable goods production is three times as important as in Detroit and also that trading activities are relatively more important in Chicago than in the other eastern cities. However, Chicago appears clearly to lead in bank debits, a phenomenon noted before and associated unquestionably with financial operation in that area. Los Angeles has some tendency to lag, with this tendency most pronounced in debits and power sales. The similarity of the economic patterns of Chicago and Los Angeles apparently does have its effects on cyclical timing, even though Chicago's debits show a pronounced lead.

A durable producers' goods area such as Cleveland, on the basis of *a priori* reasoning, should show a tendency to lead the more diversified economies or, more particularly, the oppositely specialized economies. Table 13 indicates that employment and power sales, particularly in Detroit, demonstrate this tendency most clearly. In Detroit the only lagging series is bank debits, whereas in Cleveland power sales also show some tendency to lag. Pittsburgh shows a measurable tendency to lag, especially in store sales and power sales. In San Francisco the lag of department store sales is likewise marked, but in other series no lead or lag appears. Therefore, Los Angeles and Pittsburgh appear to show the

most consistent lag; this is somewhat surprising in view of the great differences between the two economies.

An examination of the bank debit series on chart 6 reveals the pe-

TABLE 13

SUMMARY OF THE CYCLICAL TIMING OF SIX AREAS, FOUR SERIES

(Combined Peaks and Troughs)

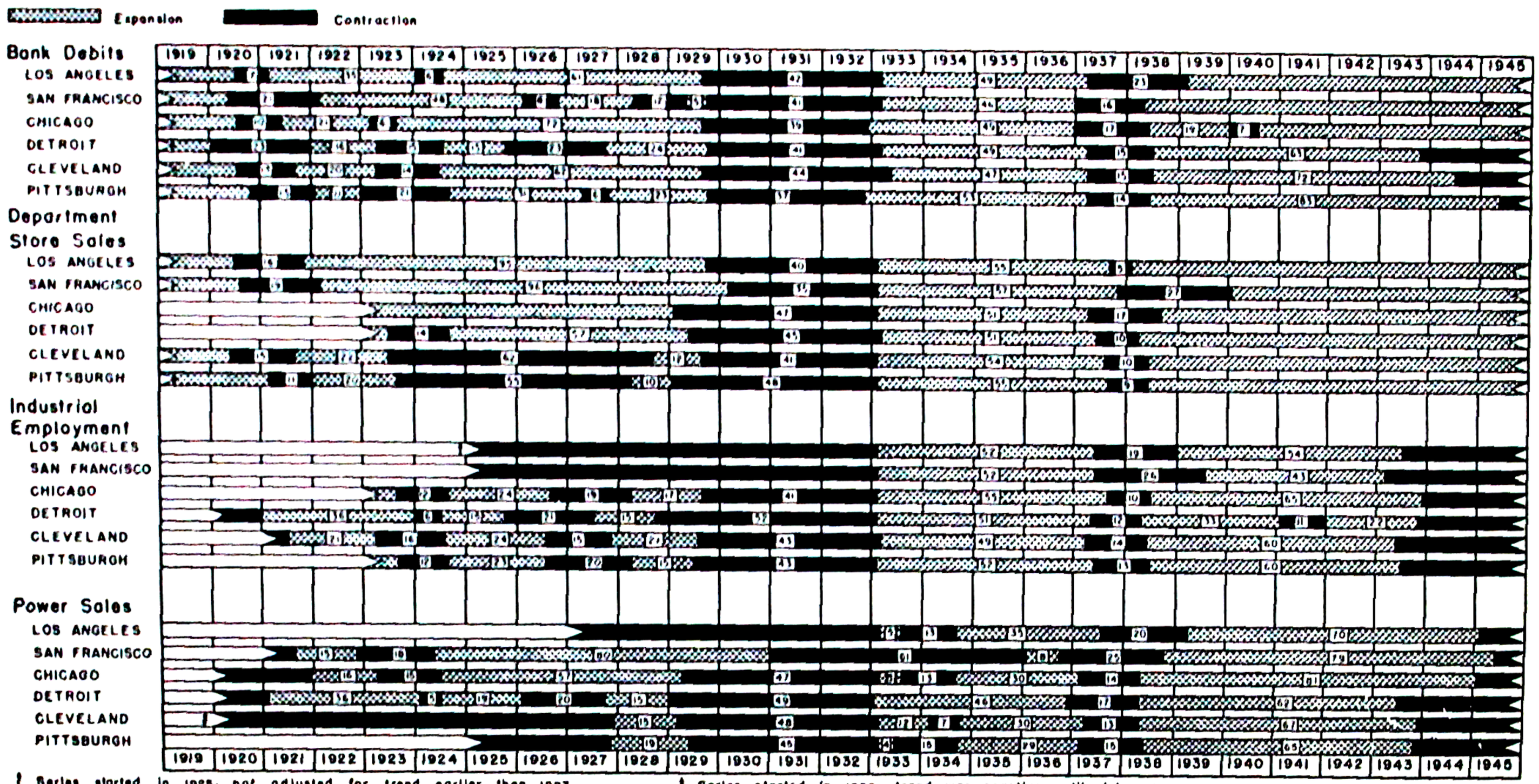
Series	Area	Number of possible positions	Number of turning points	Number of times area is in each position in the comparison		
				First group	Either first or second	Second group
Employment	Detroit.....	44	9	7	0	2
	Cleveland....	44	9	4	3	2
	Pittsburgh....	44	9	2	4	3
	San Francisco	24	4	2	0	2
	Los Angeles...	24	4	1	1	2
	Chicago.....	44	9	1	2	6
Bank debits	Chicago.....	46	8	7	0	1
	San Francisco	36	6	3	0	3
	Cleveland....	49	9	3	1	5
	Pittsburgh....	49	9	3	0	6
	Los Angeles...	46	8	2	0	6
	Detroit.....	49	9	2	0	7
Department store sales	Detroit.....	26	5	4	0	1
	Chicago.....	23	4	3	0	1
	Cleveland....	34	7	3	3	1
	Los Angeles...	31	6	3	1	2
	Pittsburgh....	34	7	1	1	5
	San Francisco	26	5	0	1	4
Power sales	Detroit.....	39	9	7	0	2
	San Francisco	27	6	3	1	2
	Pittsburgh....	38	8	2	2	4
	Chicago.....	44	10	2	3	5
	Cleveland....	38	8	2	1	5
	Los Angeles...	31	6	1	1	4

SOURCE: Derived from data in appendix ii.

culiarities in each area in the amount of lead or lag of turning point dates, and in duration of cyclical change. The most striking feature in chart 6 is the great similarity in timing after 1929, and the divergence before that date. In 1929, only one month separated the downturns in all six areas; in 1932, 1933, the spread was six months; in 1937, three months,

CHART 6

Timing and Duration of Business Cycles in Four Series, Selected Areas, 1919-1945



‡ Series started in 1925, not adjusted for trend earlier than 1927

† Series started in 1920, trend was negative until July, 1921

Source: Derived from data in Appendix II

and in the upturn of 1938, 1939, it had increased to ten months. Contrasted with this, the lower turning points in 1921, 1922, were as much as twelve months apart, the downturn of 1923, thirteen months, and throughout the remainder of the decade there was so much divergence that it is impossible to compare all six areas. To reduce the detail to manageable proportions, table 14 presents the dates of the turning points in bank debits, with the earliest dated turning point at the left, and the latest on the right; and table 15 presents the duration of comparable cycles in debits in the areas. Where these turning points occur in the same month, the areas and the dates are italicized. The points have been selected according to method mentioned in chapter i, note 30. The absence of turning points before 1920 and after 1939 is because in these terminal periods none could be identified.

The earliest turning point in debits occurred in Detroit in February, 1920. That area led all others by four to nine months, which is not at all surprising since in February transportation equipment nationally began moving downward. In automobile manufacture, February is also generally a very low month seasonally. Even though the data have been adjusted for seasonal variation, it is quite probable that some elements of seasonal change remain, and it is also likely that a seasonal downturn in automobile production would hasten a latent nonseasonal decrease in that industry and, hence, in Detroit's debits. The lateness of the downturn in Cleveland and Pittsburgh is associated with a number of things, most important among which is the tardiness of the postwar slump in the iron and steel industry. This tardiness was largely because, one, in these early years, the relative importance of the automobile industry as a market for steel was not so great as it is currently; two, and conversely, in the years following World War I, the construction and railroad industries were relatively more important markets for steel than they are today. The sharp decline in the automobile industry noted above, therefore, could not cause an early downturn of iron and steel production, since steel operations were being supported by very strong activity in railroads and, particularly, in construction.[8] As a result, basic iron and steel production remained normal for the first nine months of 1920.[9]

Los Angeles led San Francisco by a full year in the upswing from this first postwar recession; only Chicago and Cleveland followed Los Angeles upward by six months or less. This lead is explainable almost wholly on terms of the substantial boom in construction activity which occurred

[8] Cf. "Review of 1923," *Review of Economic Statistics*, Vol. VI (1924), p. 5.
[9] Cf. Iron and Steel Institute, *Iron Trade Review*, Vol. 68, p. 1629; Temporary National Economic Committee, *The Basing Point Problem*, Monograph No. 42 (Washington, 1941); and National Industrial Conference Board, *The Economic Almanac for 1945–46* (New York, 1946), p. 274.

TABLE 14

RANKING OF TURNING POINTS IN BANK DEBITS IN SELECTED AREAS, 1919–1945

Year	Peak or trough	1	2	3	4	5	6
1920	P	Detroit 2/20	San Francisco 6/20	*Los Angeles 8/20*	*Chicago 8/20*	*Cleveland 8/20*	Pittsburgh 11/20
1921 1922	T	Los Angeles 3/21	Chicago 6/21	Cleveland 9/21	Detroit 1/22	Pittsburgh 2/22	San Francisco 3/22
1923 1924	P	Pittsburgh 1/23	Chicago 32/3	*Cleveland 5/23*	*Detroit 5/23*	Los Angeles 2/24	
1923 1924	T	Chicago 9/23	Cleveland 7/24	*Detroit 8/24*	*Los Angeles 8/24*	Pittsburgh 10/24	
1929	P	*Los Angeles 9/29*	*Chicago 9/29*	*Cleveland 9/29*	*Detroit 10/29*	*Pittsburgh 10/29*	*San Francisco 10/29*
1932 1933	T	Pittsburgh 11/32	Chicago 12/32	*Los Angeles 3/33*	*San Francisco 3/33*	*Detroit 3/33*	Cleveland 5/33
1937	P	*San Francisco 1/37*	*Chicago 1/37*	*Los Angeles 4/37*	*Detroit 4/37*	*Cleveland 4/37*	*Pittsburgh 4/37*
1938 1939	T	San Francisco 5/38	*Chicago 6/38*	*Pittsburgh 6/38*	*Detroit 7/38*	*Cleveland 7/38*	Los Angeles 3/39
1943 1944 1945	P	Detroit 10,43	Cleveland 7,44	Pittsburgh 5,45			

SOURCE: Derived from data in appendix ii.

Only comparable turning points are ranked. All turning points appear on charts 6 and 7. Areas with the same turning-point dates and, therefore, with the same rank are italicized.

in Los Angeles in this period. An index of the total dollar valuation of building permits in southern California from 1919 to 1925 (with the 1919 average equal to 100) is provided in table 16.[10] By March, 1921, the index was nearly 150 per cent greater than in March, 1920; and, from early 1921 until late 1923, permits moved steadily upward. It was not until March, 1924, that monthly values began to fall below those for the same month in the previous year, and even then they were roughly five times as high, on the average, as in 1919; in none of the years following 1921 did they sink to 1920 levels.

This increase in activity in the real estate market was based upon phenomenal increases in population in the area. Between 1910 and 1920, population in the Los Angeles area increased 86 per cent as compared with only a 30 per cent increase in San Francisco, whereas Pittsburgh population increased in this decade by slightly less than 20 per cent. What is more, the immediate postwar period in Los Angeles saw a continuation of the rapid increase in population; as a consequence, both a "real" demand for residential and commercial structures and a speculative demand made themselves effective. The annual increase in population between 1920 and 1925 in Los Angeles was 16.7, 12.5, 11.1, 20.7, and 5.4 per cent. Thus, the early 'twenties saw enormous increases in population in Los Angeles, from 936,455 in 1920 to 1,737,570 in 1925. Reper-

cussions on the timing, not only of cycles in bank debits, but in all series reflecting business conditions, are certainly to be expected.

Unlike Los Angeles, San Francisco did not experience the same population growth in the immediate postwar period, for the annual percentage increases between 1920 and 1925 in that area were 3.5, 3.8, 1.6, 5.4, and 2.8 per cent. Comparing these with the same values in Los Angeles, which appear above, it is apparent that until 1924 annual percentage increases in Los Angeles were from approximately two to nine times those in San Francisco. Combining these low increases in San Francisco with the fact that the war period itself did not provide a population increment in that area of nearly the proportions of that in Los Angeles, the reason for the contrasting position of the two areas (particularly the former's eleven months' lag) becomes apparent. Detailed data are not available for population change in the other areas, with the exception of Cleveland, but in that area between 1920 and 1925, the annual percentage increase in population never exceeded 2.6 per cent. Measures of the number of property transfers and of the volume of mortgage finance suggest that the inflated level of building activity characteristic of Los Angeles was not paralleled in Cleveland.[11] It seems certain, therefore, that population

[10] See p. 75, note to table 16.

[11] These data are from H. W. Green, *Cleveland Market Data Handbook*, Real

TABLE 15

Duration of Cycles in Bank Debits in Selected Areas

Peak-to-peak dates	Trough-to-trough dates	Area	Duration (in months)	Explanatory remarks
1920–1924		Pittsburgh....	26	San Francisco omitted because last peak occurred more than two years later than other peaks
		Chicago.....	31	
		Cleveland....	33	
		Detroit.....	39	
		Los Angeles...	42	
	1921–1924	Chicago.....	27	San Francisco omitted because last peak occurred more than two years later than other peaks
		Detroit.....	31	
		Pittsburgh....	32	
		Cleveland....	34	
		Los Angeles...	41	
1923–1929		Los Angeles...	67	San Francisco, Detroit, and Pittsburgh had extra noncomparable cycles
		Cleveland....	76	
		Chicago.....	78	
	1924–1933	Los Angeles...	103	San Francisco, Detroit, and Pittsburgh had extra noncomparable cycles
		Cleveland....	106	
		Chicago.....	111	
1929–1937		San Francisco	87	
		Chicago.....	88	
		Detroit.....	90	
		Pittsburgh....	90	
		Los Angeles...	91	
		Cleveland....	91	
	1933–1938, 1939	San Francisco	62	
		Cleveland....	62	
		Detroit.....	64	
		Chicago.....	66	
		Pittsburgh....	67	
		Los Angeles...	72	
1937–1945		Detroit.....	78	Los Angeles and San Francisco had no peaks after 1937. Chicago had a short cycle
		Cleveland....	87	
		Pittsburgh....	97	

Source: Derived from data in appendix ii.

growth and the attendant developments in construction were the unique factors in Los Angeles and account for its substantial lead into the recovery from the depression of 1921.

The downturn in 1923 found Pittsburgh leading Los Angeles by thirteen months, for Pittsburgh reached its peak in bank debits in January, 1923, whereas the upswing in southern California continued until February, 1924. The other areas, however, followed Pittsburgh in rapid succession, with Chicago reaching a peak in March, 1923, and Cleveland and Detroit in May of that year; San Francisco's recovery from the trough continued to March, 1926, and its peak lagged more than fifteen months behind the latest area, Los Angeles, which reached the upper turning point in February, 1924. Application of the arbitrary rule (that a spread between two consecutive turning points in excess of fifteen months justifies separate treatment) precluded the notation of the San Francisco peak in table 14. The spread of nine months between Los Angeles, the latest, and Detroit, the next latest, is explainable largely in terms of the high level of construction activity in southern California and by the fact that the output of consumers' goods, unlike basic materials, remained

TABLE 16

INDEX OF BUILDING PERMITS IN SOUTHERN CALIFORNIA, 1919–1925
(1919 = 100)

Month	1919	1920	1921	1922	1923	1924	1925
Jan.....	37.0	182.8	148.0	347.6	529.3	629.7	543.4
Feb.....	49.2	151.6	148.0	351.6	641.8	712.9	501.6
March.....	40.2	105.5	251.2	366.0	680.5	571.1	501.6
April.....	62.9	144.1	276.9	490.6	559.8	509.8	516.8
May.....	83.6	121.5	291.8	371.1	669.5	416.0	588.3
June.....	78.5	257.8	251.2	394.1	638.7	429.7	556.2
July.....	80.8	208.6	230.1	344.9	582.4	489.4	469.1
Aug.....	109.4	300.8	310.5	473.4	818.0	588.3	603.9
Sept.....	107.0	299.7	354.3	424.2	597.3	566.0	521.1
Oct.....	164.4	243.0	380.1	462.5	726.2	462.1	473.4
Nov.....	234.0	266.8	378.9	523.0	644.5	477.0	477.7
Dec.....	150.8	151.6	374.2	376.9	685.2	546.9	655.5

SOURCE: Security–First National Bank of Los Angeles, *Description of the Security–First National Bank of Los Angeles Index of Business Activity in Southern California and Its Component Series*, December, 1945. The data represent permits issued in the unincorporated areas of Los Angeles and San Diego counties, and in the forty-nine cities in southern California having the highest permit valuations each month.

peak in table 14. The spread of nine months between Los Angeles, the latest, and Detroit, the next latest, is explainable largely in terms of the high level of construction activity in southern California and by the fact that the output of consumers' goods, unlike basic materials, remained

Property Inventory of Metropolitan Cleveland, 1945, pp. 57, 63. The population figures are for Cuyahoga County only, whereas the Cleveland Industrial Area includes also Lorain County. The latter represents such a small proportion of total area population that it is probable that the Cuyahoga County data represent satisfactorily the area.

high. Pittsburgh's leading position in this downswing, despite the fact that iron and steel in the nation as a whole did not turn down until the middle of the year, is connected with the shifting and growing emphasis on light steel products as opposed to Pittsburgh's heavier items and to abnormal stocks of merchant pig iron that had been accumulated. Between the trough of 1921 and the next succeeding peak, the production of steel ingots and steel for castings increased 108 per cent in the nation and only 91 per cent in the Pittsburgh district.[12] At the same time the the production of automobiles, the principal market for light steel, considerably more than doubled and, by 1923, reached a level of output actually 15 per cent above the 1935–1939 average.[13] The relatively late downturn in automobile production accounts for both the lag of Detroit behind Pittsburgh and also, probably, for Cleveland's tardy downturn. Pittsburgh, not so closely associated with this steel market, did not recover from the 1921 trough to as high a peak as Detroit, nor was its expansion as long as those of Detroit and Cleveland.

San Francisco, as mentioned above, presents a special case, since it did not reach an upper turning point in debits until March, 1926, more than a year and a half later than Los Angeles. San Francisco was not favored by unprecedented construction activity as was Los Angeles, but evidence suggests that San Francisco was participating in the general statewide growth that characterized the decade of the 'twenties. For example, the relative importance of trading operations in that area increased substantially, as reference to table 3 (p. 22) shows, whereas trends in industrial employment and store sales increased out of proportion to the small increases in population of the San Francisco area. These state-wide forces likewise exerted much influence on Los Angeles, but in this area construction so dominated conditions that a cycle, generally comparable in pattern, but different in cause, with that experienced in the East, was superimposed upon the underlying movement.

An upturn in the latter half of 1924 occurred in all the areas (except San Francisco, which moved upward steadily from 1922, and Chicago, which characteristically moved upward earlier in September, 1923), with the maximum lag (Pittsburgh behind Cleveland), only three months. Cleveland turned upward in July, 1924, Detroit and Los Angeles in August, and Pittsburgh in October. Possibly the fact that Cleveland and Detroit moved upward several months ahead of Pittsburgh is related to the sharp increase in automobile production (17 per cent between 1924

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[12] Bureau of Business Research, University of Pittsburgh, *Industrial Databook for the Pittsburgh District* (Pittsburgh, 1936), p. 30. The data were adjusted for trend so that the percentage figures refer to change in trend-adjusted, not the raw, data.

[13] Data from Automobile Manufacturers Association, Detroit, Michigan; mimeographed tabulation, undated.

and 1925), but the smallness of the spread makes the wisdom of such a conclusion somewhat doubtful. Oddly enough, the whole cycle ending in the 1924 trough, except for Chicago, has been said to be "the one cycle of the past twenty-five years which appears to have been a fully normal cycle when considered in the light of business cycle theory."[14] However, the use of the word "normal" may be questioned; it seems that in this cycle episodic factors were less important than is oftentimes the case. Support to the belief that this particular cycle was exceptionally "orderly" in nature is given by various data provided by Burns and Mitchell which indicate that nine of ten manufacturing industries reached the turning point in 1924 within a span of only four months; the one industry which deviated from this pattern was tobacco.[15] In addition the fall and the rise of commodity prices were gradual, and physical output also reacted slowly.[16]

The atypical nature of the depression following 1929 is observable at the outset by the fact that bank debits in all areas reached an upper turning point in either September or October of 1929. Los Angeles, Chicago, and Cleveland turned down in September; Detroit, Pittsburgh, and San Francisco, in October. In this connection it should be remembered that the data which were originally index numbers, and, consequently, only samples of the universe, are subject to two types of error, one involving the nonrepresentative nature of the particular sample represented by the index, and one affected by the adjustments made by necessarily arbitrary techniques. For these reasons, the data are not sufficiently accurate to identify as real such small differences in turning points.[17] For purposes of this study, therefore, this peak must be looked upon as one which appeared simultaneously in all areas. The downturn in the fall of 1929 was precipitated by the collapse of stock prices, and the early phases of the recession were unquestionably a reflection of the chaos in financial markets. This may account for the unusual near-coincidence of the peaks in debits and, even though it may involve some digression, a comparison of the picture of debit turning points in 1929 with other series, not so intimately associated with financial affairs, is worth-while at this point.

The discussions of the remaining three series will not be so detailed as that for bank debits. The bank debits series is generally more inclusive and, in this period, more complete in each area than is true for the other series. To give so detailed a discussion of store sales, em-

[14] L. P. Ayres, *Turning Points in Business Cycles* (New York, 1939), p. 147.
[15] Burns and Mitchell, *Measuring Business Cycles*, p. 68.
[16] Cf. Federal Reserve Board, *Twelfth Annual Report*, Washington, D.C., pp. 2–3.
[17] It may be significant that steel and pig-iron industries lagged behind automobile production. Cf. *Review of Economic Statistics*, Vol. XII, No. 1 (February, 1930), p. 3.

TABLE 17

TURNING POINTS IN DEPARTMENT STORE SALES IN SELECTED AREAS, 1919–1945

Year	Peak or trough	1	2	3	4	5	6
1920	P	Cleveland	Los Angeles	San Francisco	Pittsburgh		
1921		6/20	7/20	8/20	2/21		
1921	T	Cleveland	Los Angeles	Pittsburgh	San Francisco		
1922		9/21	11/21	1/22	3/22		
1923	P	*Cleveland*	*Detroit*	Pittsburgh			
		7/23	*7/23*	9/23			
1929	P	*Chicago*	*Pittsburgh*	Detroit	Cleveland	Los Angeles	San Francisco
1930		*2/29*	*2/29*	6/29	9/29	10/29	3/30
1933	T	Chicago	*Pittsburgh*	*Cleveland*	*Los Angeles*	*San Francisco*	Detroit
		1/33	*2/33*	*2/33*	*2/33*	*2/33*	3/33
1937	P	Chicago	Detroit	Cleveland	*Pittsburgh*	*Los Angeles*	San Francisco
		4/37	6/37	8/37	*9/37*	*9/37*	11/37
1938	T	Los Angeles	Detroit	*Cleveland*	*Pittsburgh*	Chicago	
		2/38	4/38	*6/38*	*6/38*	9/38	

SOURCE: Derived from data in appendix ii.

Only comparable turning points are ranked. All turning points appear on charts 6 and 7. Areas with the same turning-point dates and, therefore, with the same rank are italicized.

ployment, and power sales would often involve repetition, and the incompleteness of these series would require the explicit statement of innumerable qualifications.

In department store sales (table 17) the turning points appear to have a much wider spread than for bank debits. Chicago and Pittsburgh led, turning downward in February, 1929, followed by Detroit in June, Cleveland in September, Los Angeles in October, and San Francisco in

TABLE 18

DURATION OF CYCLES IN DEPARTMENT STORE SALES IN SELECTED AREAS

Peak-to-peak dates	Trough-to-trough dates	Area	Duration (months)	Explanatory remarks
1923–1929		Detroit.....	71	There are no comparable cycles in more than three cities until the expansion starting in 1933
		Cleveland....	74	
		Pittsburgh....	74	
1929–1937		San Francisco	92	
		Pittsburgh....	94	
		Los Angeles...	95	
		Cleveland....	95	
		Detroit.....	96	
		Chicago.....	98	
	1933–1938	Los Angeles...	60	The San Francisco period ended almost two years later than did the others, but is included even though not strictly comparable
		Detroit.....	61	
		Cleveland....	64	
		Pittsburgh....	64	
		Chicago.....	68	
		San Francisco	84	

SOURCE: Derived from data in appendix ii.

March, 1930. Hence, between the earliest and latest month, an eleven months' lag exists. The earliest downturn in store sales preceded the downturn in the bank debits by seven months. San Francisco is the only exception in that its downturn in sales lagged five months behind debits (it turned downward latest in both series).

Industrial employment and industrial and commercial power sales (tables 19 and 21) do not provide so valid a comparison as do the other two series because of some lack of comparableness between the series, but it is significant that in both cases the downturn occurred earlier.[18] In neither case can the turning point in Los Angeles or San Francisco be identified, but in the remaining series as a group the points fell between October, 1928 (employment in Detroit), and September, 1929 (employ-

[18] Cf. chap. i and app. i.

TABLE 19

TURNING POINTS IN INDUSTRIAL EMPLOYMENT IN SELECTED AREAS, 1919–1945

Year	Peak or trough	1	2	3	4	5	6
1923	P	Cleveland	*Pittsburgh*	*Chicago*	Detroit		
1924		4/23	*9/23*	*9/23*	1/24		
1924	T	Detroit	Cleveland	*Pittsburgh*	*Chicago*		
		7/24	8/24	*9/24*	*9/24*		
1925	P	Detroit	*Cleveland*	*Pittsburgh*	Chicago		
1926		10/25	*8/26*	*8/26*	9/26		
1927	T	Detroit	Cleveland	*Pittsburgh*	*Chicago*		
1928		7/27	11/27	*4/28*	*4/28*		
1928	P	Detroit	Pittsburgh	Cleveland	Chicago		
1929		10/28	7/29	8/29	9/29		
1933	T	*Detroit*	*Los Angeles*	*Pittsburgh*	*Chicago*	*San Francisco*	Cleveland
		2/33	*2/33*	*2/33*	*2/33*	*2/33*	3/33
1937	P	Cleveland	Detroit	*Pittsburgh*	*Los Angeles*	*San Francisco*	Chicago
		4/37	5/37	*6/37*	*6/37*	*6/37*	9/37
1938	T	Detroit	Cleveland	*Pittsburgh*	*Chicago*	Los Angeles	San Francisco
1939		5/38	6/38	*7/38*	*7/38*	1/39	8/39
1943	P	San Francisco	Cleveland	*Pittsburgh*	*Los Angeles*	Detroit	Chicago
		3/43	6/43	*7/43*	*7/43*	11/43	12/43

SOURCE: Derived from data in appendix ii.

Only comparable turning points are ranked. All turning points appear on charts 6 and 7. Areas with the same turning-point dates and, therefore, with the same rank are italicized.

TABLE 20

DURATION OF CYCLES IN INDUSTRIAL EMPLOYMENT IN SELECTED AREAS

Peak-to-peak dates	Trough-to-trough dates	Area	Duration (months)	Explanatory remarks
1923–1926		Detroit.....	21	Los Angeles and San Francisco excluded because of lack of data
		Pittsburgh....	35	
		Chicago.....	36	
		Cleveland....	40	
	1924–1927, 1928	Detroit.....	36	Los Angeles and San Francisco excluded because of lack of data
		Cleveland....	39	
		Chicago.....	43	
		Pittsburgh....	43	
1925–1929		Pittsburgh....	35	Los Angeles and San Francisco excluded because of lack of data
		Chicago.....	36	
		Detroit.....	36	
		Cleveland....	36	
	1927–1933	Chicago.....	58	Los Angeles and San Francisco excluded because of lack of data
		Pittsburgh....	58	
		Cleveland....	64	
		Detroit.....	67	
1929–1937		Cleveland....	92	Los Angeles and San Francisco excluded because of lack of data
		Pittsburgh....	95	
		Chicago.....	96	
		Detroit.....	103	
	1933–1938	Detroit.....	63	
		Cleveland....	63	
		Chicago.....	65	
		Pittsburgh....	65	
		Los Angeles...	71	
		San Francisco	78	
1937–1943		San Francisco	69	Detroit not included because of an extra cycle
		Pittsburgh....	73	
		Los Angeles...	73	
		Cleveland....	74	
		Chicago.....	75	

SOURCE: Derived from data in appendix ii.

TABLE 21

TURNING POINTS IN INDUSTRIAL AND COMMERCIAL POWER SALES IN SELECTED AREAS, 1919–1945

Year	Peak or trough	1	2	3	4	5	6
1921	T	Detroit 2/21	San Francisco 8/21	Chicago 12/21			
1922	P	San Francisco 11/22	Chicago 11/23	Detroit 2/24			
1923							
1924							
1924	T	San Francisco 5/24	*Chicago 7/24*	*Detroit 7/24*			
1927	T	Detroit 10/27	Pittsburgh 11/27	Cleveland 12/27			
1929	P	Detroit 1/29	Cleveland 3/29	Chicago 4/29	Pittsburgh 6/29		
1933	T	Detroit 2/33	*Chicago 3/33*	*Cleveland 3/33*	*Pittsburgh 3/33*	*Los Angeles 3/33*	
1933	P	Pittsburgh 7/33	*Los Angeles 8/33*	*Chicago 8/33*	Cleveland 3/34		
1934							
1934	T	*Los Angeles 9/34*	*Chicago 9/34*	*Pittsburgh 10/34*	*Cleveland 10/34*		
1936	P	San Francisco 10/36	Detroit 12/36	*Chicago 3/37*	*Pittsburgh 3/37*	Cleveland 4/37	Los Angeles 8/37
1937							
1938	T	*Detroit 5/38*	*Chicago 5/38*	*Cleveland 5/38*	Pittsburgh 6/38	San Francisco 11/38	Los Angeles 4/39
1939							
1943	P	Detroit 7/43	Pittsburgh 11/43	Cleveland 12/43	Chicago 2/45	Los Angeles 2/45	San Francisco 6/45
1945							

SOURCE: Derived from data in appendix ii.

Only comparable turning points are ranked. All turning points appear on charts 6 and 7. Areas with the same turning-point dates and, therefore, with the same rank are italicized.

TABLE 22

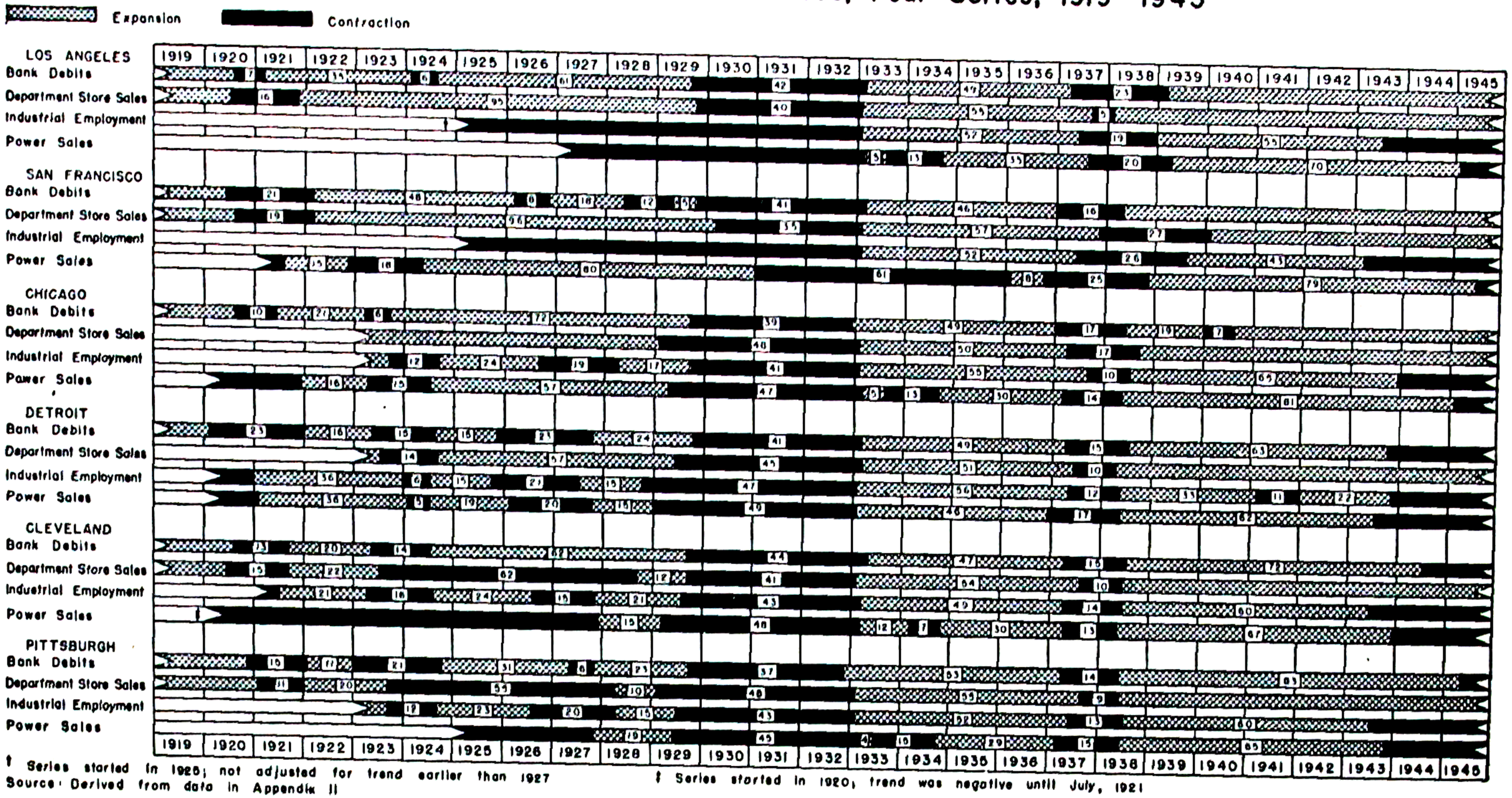
DURATION OF CYCLES IN INDUSTRIAL AND COMMERCIAL POWER SALES IN SELECTED AREAS

Peak-to-peak dates	Trough-to-trough dates	Area	Duration (months)	Explanatory remarks
	1921–1924	Chicago.....	31	Cleveland—no turning point until 1927
		San Francisco	33	Pittsburgh—data not available
		Detroit.....	41	Los Angeles—data not available
	1927–1933	Cleveland....	63	Chicago—continuous expansion from 1924–1929
		Pittsburgh....	64	Los Angeles—no turning point until 1933
		Detroit.....	64	San Francisco—continuous expansion from 1924–1931
1929–1933, 1934		Pittsburgh....	49	Los Angeles—no turning point until 1933
		Chicago.....	52	San Francisco—data not comparable
		Cleveland....	60	Detroit—continuous expansion from 1933–1936
	1933–1934	Los Angeles...	18	San Francisco and Detroit data not comparable
		Chicago.....	18	
		Cleveland....	19	
		Pittsburgh....	19	
1933, 1934–1936, 1937		Cleveland....	37	San Francisco and Detroit data not comparable
		Chicago.....	43	
		Pittsburgh....	44	
		Los Angeles...	48	
	1934–1938, 1939	Cleveland....	43	San Francisco and Detroit data not comparable
		Chicago.....	44	
		Pittsburgh....	44	
		Los Angeles...	55	
1937–1945		Detroit.....	79	
		Cleveland....	80	
		Pittsburgh....	80	
		Los Angeles...	90	
		Chicago.....	95	
		San Francisco	104	

SOURCE: Derived from data in appendix ii.

CHART 7

Timing and Duration of Business Cycles in Selected Areas, Four Series, 1919 - 1945



† Series started in 1926; not adjusted for trend earlier than 1927

‡ Series started in 1920; trend was negative until July, 1921

Source: Derived from data in Appendix II

ment in Chicago). Evidently, the bank debit series does overstate somewhat the similarity in turning points as a result of its sensitiveness to security trading. Detroit's lead in the "real" series (power sales and employment) as opposed to its lag, or at least equal standing, in bank debits is understandable in view of its emphasis on the manufacture of automobiles (chart 7). On an analogous basis, the lag of the real series in Chicago as opposed to its lead in the money series is understandable. The divergence in the dates of the store sales peak in Chicago and in San Francisco is somewhat unusual in view of the substantial similarity between the areas but, when it is recognized that department store sales in Chicago are affected by the operations of mail order houses, this difference hardly seems unreasonable. Again Burns and Mitchell provide substantiating material on the basis of their treatment of series describing the movements of ten manufacturing industries. They point out that a peak was reached as early as September, 1926, in stone and as late as November, 1929, in food and leather. Eight out of the ten turned downward between February and November, 1929, however.[19]

Unusual Turning-Point Dates Before 1930

Before examining the post-1929 period, it is worth-while to reconsider the preceding decade to pick up the occasional odd turning points that do not seem to conform to the more usual pattern. Specifically, the late 1926 trough in San Francisco, the May, 1927 peak in Pittsburgh, and the May, 1928 peak in San Francisco and its subsequent May, 1929 trough require some special consideration. Detroit, San Francisco, and Pittsburgh showed an extra cycle following 1925 (in San Francisco's case, two extra cycles) which gives to these areas turning points that are unique. These cycles appear in the series of chart 6 and are most apparent in debits and employment. This half-decade has been said to contain a trough in 1924, a peak in 1926, and a trough in 1927; these dates, in fact, are reference cycle dates of the National Bureau of Economic Research. However, the series utilized here do not indicate a clear-cut, economy-wide cycle, since only in the three areas mentioned above does even the semblance of such a cycle appear.

The peaks of November, 1925 and March, 1926 which appear in bank debits in Detroit and in San Francisco seem to be isolated downturns and are reflected neither in similar movements in other areas nor in similar movements in store sales in the same areas.

Pittsburgh's bank debits showed a six months' recession starting in May, 1927, which is paralleled by employment in Pittsburgh but not closely by movements in other areas. True, this decrease in debits is

[19] Burns and Mitchell, *op. cit.*, pp. 68–69.

overlapped by more protracted declines in the remaining Pittsburgh series, owing, in general, to the previous speculative excesses in steel production, to the termination of the real estate boom, and to falling railroad earnings, but these hardly account for the peculiar timing of the peak, May, 1927.[20] Unlike San Francisco's 1926 peak, this one is not short-lived, but represents a six months' high level of values. Perhaps the significance of this peak is magnified by the subsequent rate of fall which far exceeded the rates of change in debits prior thereto. In any case, the cumulative effect of certain events in periods immediately adjacent to this peak very likely bears a major responsibility for it. On the one hand are the successes of the Chevrolet and the Frigidaire; on the other, the shutdown of the Ford Motor Company, and a severe coal strike. These, together with the longer recession in employment in Pittsburgh, could well account for this unusual movement.

This cycle in employment is similar in every area, whereas it appears in power sales only in Detroit. The Cleveland and Los Angeles power series are not complete enough to reveal such a cycle, and Pittsburgh shows a cycle too slight to record. It would, thus, seem that debits in Detroit are sufficiently related to employment to reflect decreasing industrial employment, but, in most other areas, other economic characteristics were sufficient to maintain rising debits in the face of some important signs of weakness. San Francisco's recession from March, 1926 is almost solely a consequence of the stock market recession of February of that year. Study of chart 10 in chapter v reveals that the peak recorded in San Francisco was very narrow; for only the first three months of the year were the bank debit values abnormally high. In months other than these, the movement was almost consistently upward, indicating that even though other series show some recession in this period, its reflection in bank debits borders on the episodic, as opposed to the purely cyclical, peak.

San Francisco alone, and then only in bank debits, shows a full cycle, peak to peak, between May, 1928 and October, 1929. Again, however, this peak is narrow; this time only two high months, May and June, account for it. In the other series for San Francisco, a definite peak either occurred late in 1929 or else that period marked the end of a plateau. Bank debits, however, have this marked turning point in 1928, with the 1929 peak a somewhat lower, but nonetheless decided, turning point. The fact that this unusual phenomenon appears only in debits, and only in San Francisco, suggests again that financial activities may be the principal cause.

Between 1928 and 1929, the volume and values of shares traded in-

[20] Schumpeter, *Business Cycles*, Vol.II, p. 790, and *Review of Economic Statistics*, Vol. X, No. 1 (February, 1928), p. 3.

creased in the major financial areas, such as New York and Chicago, and remained roughly constant in Detroit and Cleveland, yet in San Francisco the value of shares traded declined 56 per cent and the number of shares likewise declined substantially. San Francisco's 1928 peak reflected extraordinary activity in several securities listed only on that exchange, such as the Bancitaly Corporation (which in the immediately preceding years had been expanding rapidly) and the Magnavox Company, and in the securities of several companies that were primarily California concerns, Richfield Oil and Kolster Radio Company. Also, May and June of 1928 represented a minor peak in the volume of security transactions, whereas new security issues in April, May, and June were extremely high. Thereafter, prices, trading, and new issues declined, all to recover later in the year. In the meantime, however, the stamp of this flurry remained on San Francisco's debits, but was erased elsewhere by the recovery.

The Timing of the 1932, 1933 Trough

The dating of the trough of the great depression presents a few interesting contrasts. The trough in debits lies between November, 1932 (Pittsburgh) and May, 1933 (Cleveland).[21] Los Angeles, San Francisco, and Detroit all reached the trough in March, 1933, and Chicago did so in December, 1932. In series other than bank debits, Pittsburgh, more than any other area, appears to have two troughs within six months of each other (chart 6); the first occurred late in 1932 followed by some recovery, and then there was further recession into early 1933.[22] At least it may be said that Pittsburgh tends generally to have a flatter trough than the other areas. This tendency is especially apparent in the employment and power series and weakest in store sales. Though the latter series fluctuated widely in late 1932, it fell steadily to March, 1933, undoubtedly as a consequence of persistent price declines. Recovery in the other series before the 1933 collapse is associated with climbing physical output.[23] Monthly output of steel, in fact output of all manufactured goods in the nation, ceased to fall in the middle of 1932 and it is, therefore, quite reasonable at least for a minor upswing to occur in Pittsburgh. Though data are not available to compare Pittsburgh's monthly changes in ouput throughout 1932 and 1933 with those of the United States, the entire output of steel in 1933 exceeded 1932 in Allegheny County (Pittsburgh)

[21] The choice of the turning point in this case was complicated by the bank holiday in March, 1933. March, 1933 was selected as the turning point, however, only if the average of February and April were lower than the average of either pair of months adjacent to March or lower than the average of any three full months.

[22] A double trough also appears in Detroit's bank debits, but this is due wholly to the Michigan bank moratorium which preceded the closure of banks nationally.

[23] Cf. Schumpeter, *op. cit.*, p. 927.

by 74 per cent and in the United States by only 65 per cent. Thus, justification for improvement exists, not only in bank debits but in all business series in Pittsburgh in the fall of 1932.

In other areas lesser emphasis on industrial operations accounts for the somewhat later, and apparently sharper, trough. Cleveland, whose bank debits were two months behind most cities in turning upward in 1933, likewise lagged somewhat in the employment upturn. In this area the final breakdown was more catastrophic than elsewhere. The movement downward from February to March in all series in Cleveland was extremely sharp, and though recovery thereafter proceeded rapidly, it did not do so at a pace sufficient to prevent a shifting forward of the turning point computed in the usual way. Thus, in this case, the method of selecting the point (averaging), together with the accentuated one-month decline, mechanically delays the upturn. In view of this and of the comparatively short lag (and its probable lack of significance), special examination of causes for a lag is unnecessary.

The 1937 Peak

Between 1933 and 1937 an upswing occurred which, unlike usual recoveries, led to a downturn in the midst of rather depressed business conditions. National income in current dollars in 1937 was 19 per cent below 1929 even though, between the troughs of 1933 and 1937, national income had increased 67 per cent. Employment by 1937, however, had nearly regained the 1929 level, whereas industrial production somewhat exceeded the 1929 level. Nonetheless, the increase in the labor force left an average of six and one-half million workers unemployed in 1937. This recovery was also unusual, since it was what has been called a "consumption recovery" and was characterized by a failure of business to make investment commitments beyond immediate requirements.[24] This uniqueness made the recovery somewhat precarious, or at least more vulnerable than would otherwise have been true, so that the 1937 downturn occurred short of full recovery. A comparison of the timing of the downturns in the various series in tables 14, 17, 19, and 21 lends some support to this thesis. In department store sales, downturns occurred from April to November, 1937, whereas the other series, affected more by business decisions and less closely related to consumption, moved downward earlier—bank debits between January and April, employment between April and September, and power sales between October, 1936 and August, 1937. Also, there appears to be a lag in store sales behind the other

[24] A. H. Hansen, *Full Recovery or Stagnation* (New York, 1938), p. 274. For sources of data, see footnotes to appendix v, below. See also A. H. Hansen, *Fiscal Policy and Business Cycles* (New York, 1941), p. 63.

series when single areas are examined. For example, store sales in San Francisco lagged behind debits ten months, five months behind employment, and thirteen months behind power sales. This lag in Pittsburgh was five, three, and six months in debits, employment, and power sales, respectively.

The several causes for the 1937 downswing largely account for the differences in timing that appear. Of all the areas, finance is most important in San Francisco and Chicago, and in these areas, therefore, a rapid response to a tightening of credit as a result of increased member bank reserve requirements is to be expected.[25] In bank debits these two areas were the first to turn downward; in power sales, San Francisco was first and Chicago third; whereas in store sales, Chicago was first and San Francisco last. In employment small differences separate the turning points in the several areas. The lag in the downturn of store sales in San Francisco is easily accounted for, since consumers' goods production is so important there and since this area serves a wide trading region.

It is interesting that Cleveland's downturn in employment, power sales, and debits came in the same month, April, and store sales lagged four months behind. Seldom do the points in most series coincide. It is not characteristic in other cities at this turning point, nor does the coincidence seem to occur frequently at any other turning point. It would seem as if this phenomenon is also associated with the peculiar "consumers' goods" nature of the recovery. Cleveland, where the manufacture of steel plate, machine tools, and machinery is concentrated, is an area which would be in this instance geared more closely to consumption than an area such as Pittsburgh, which is concentrated in production far removed from consumers' goods stages. Another indication of the unusual character of this downturn is to be found in the fact that Detroit's series moved closely together: debits, employment, and store sales turned down in April, May, and June, 1937, respectively, whereas power sales led, turning down in December, 1936. This one deviation is possibly because of the difficulties of seasonal adjustment and should not obscure the similarity of the other series. Of course, this particular timing is associated with factory sales of automobiles which reached a peak in April and declined precipitously thereafter. The unusually rapid reaction of store sales in Detroit is unquestionably a consequence of the unique distribution of income by source, though data on this point are unavailable. However, the dependence of such a large block of the population on wages, and especially on wages in an industry so markedly suffering

[25] Reserve requirements of member banks increased in August, 1936, and again in March and May, 1937. By the last date, reserve requirements were doubled over their pre-1936 level.

from a recession as was the automobile industry, is certainly likely to lead to almost simultaneous decreases in consumer purchases.

The only notable peculiarity of Los Angeles is that power sales tend to lag somewhat in the downturn behind the other series. Elsewhere there is a marked tendency for power sales to lead, at least in this period. This tendency to lag is a result purely of the seasonal adjustment. The division of the unadjusted index values by the moving average yielded values for power sales in July and August, 1937 that were extraordinarily high, and these values were, therefore, omitted from the arrays from which the seasonal indexes were computed. Consequently, the seasonally-adjusted values were higher than they would have been had the seasonal index been higher from the inclusion of these values in the array. The possibility of faulty adjustment in this sense cannot be eliminated and, in fact, from time to time may distort adjusted series. Proper statistical procedure indicates only that note be taken of distortions of this type. No means of avoiding them exist. In any event, with this "mechanically explainable" exception, the series in Los Angeles at this turning point offer no unusual characteristics. Los Angeles appeared to occupy an average position, neither leading nor lagging.

The 1938, 1939 Trough

The trough occurring either in 1938 or 1939 offers some unusual and interesting contrasts. Detroit moved upward first in employment and power sales, San Francisco led slightly in debits, and Los Angeles led in store sales. San Francisco's lower turning point in department store sales is not recorded in table 17, however, since it lagged behind Chicago by some seventeen months, until February, 1940. Los Angeles, leading in department store sales, is latest in debits (the opposite of San Francisco).

The substantial lead of Los Angeles in store sales, together with some lead in Detroit, is to be accounted for by several factors. First, population in the Los Angeles area rose rapidly in 1938, at a rate of nearly 10,000 persons per month. Second, wage rates moved upward, in spite of declining employment. Sales thereby were maintained and even increased in the face of depressed employment, debits, and power sales. Detroit's lead in debits is slight, but is associated with an early upturn in employment and in power sales and with general wage increases in the automobile industry during 1938.

Perhaps the most significant difference in this recovery is the lateness of power sales and employment in both San Francisco and Los Angeles to turn upward. A number of innovations and increases in the capacity of the steel industry, together with a growing export demand for armaments, gave to the heavy manufacturing centers of the East an impetus

to recovery not felt in the western areas until somewhat later. Though Los Angeles particularly experienced a delayed benefit from foreign orders, the output of the aircraft industry declined or remained constant throughout the greater part of 1938. By the end of 1939, however, the direct effects of war were apparent in the West. The aircraft industry almost doubled its output in that year alone. The nature of the stimulus to recovery from this depression is alone sufficient to explain this general lag of the West.

Only two series, power sales and employment, show upper turning points terminating the wartime recovery and prosperity in all cities. The

TABLE 23

RANKING OF TURNING POINTS, FOUR SERIES COMBINED, SIX AREAS

Area	Number of possible turning-point positions	Number of turning points	First group	Either first or second group	Second group
Cleveland.....	165	33	12	8	13
Pittsburgh.....	165	33	8	7	18
Detroit.....	158	32	20	0	12
Chicago.....	157	31	13	5	13
Los Angeles....	132	24	7	3	14
San Francisco..	113	21	8	2	11

SOURCE: Derived from data in table 13, p. 69.

value series, debits and store sales, can hardly be expected to turn downward in the face of the price inflation and the enormous increases in consumers' outlay that were occurring. The series that are relatively unaffected by price turned downward with the declining volume of war orders, as should be expected. San Francisco, a shipbuilding center, began to lose in employment in March, 1943, whereas Cleveland, Pittsburgh, and Los Angeles followed in the middle of that year, some three months later. Detroit and Chicago did not turn downward until the year's end. Little justification for further detailed examination of this downturn exists, however, since the causes can hardly be called normal and the pattern is unlikely to be duplicated under peacetime conditions.

The foregoing detail with respect to timing of turning points may be summarized by the following data which represent totals of the figures for each area appearing separately for each series. Thus, out of 158 possible rankings, the thirty-two turning points in the Detroit series tend to lead some of the other areas twenty times (not always are the same areas compared because of the absence of comparable cycles), whereas in only twelve cases do Detroit's points fall in the last half of the

rankings. Los Angeles and Pittsburgh indicate a strong tendency to lag. In Pittsburgh, the number which might properly fall into either the first or second group is relatively large, whereas for Detroit and Los Angeles it is either nonexistent or rather small. Chicago, San Francisco, and Cleveland show neither a lead nor a lag. These results are somewhat contrary to those derived from table 10. The principal reasons for this divergent result are that the results shown in table 10 refer only to bank debits, involve fewer turning points, and involve not only the presence or absence of lead or lag, but also their length. Table 10 indicates clearly that Pittsburgh lags some, that Detroit leads, and that, especially in recent years, Los Angeles tends to lag.[26] Contrarily, on the basis of table 10, Chicago shows a marked lead but, when all series are compared on the basis of the ranking above, no such lead is evident. Although it is yet too early to be sure, it would seem that the cycle in Chicago as measured by bank debits differs substantially from the cycle otherwise measured, primarily because of the unusual significance of financial operations in that area.

Conclusions: Duration

Table 24 presents for each series in each area the average monthly duration of both phases and the average total cycle. These, like all averages, hide detail; shortness of certain series makes the comparisons of average duration of somewhat dubious validity. Wherever the error that is introduced by this shortness of the series appears great, the cycle duration in that series was not computed. For example, for only two series in Los Angeles can average duration be measured. This area's employment and power sales are too short to permit the computation of significant averages. Generally, their interpretation as measures of the absolute difference in duration either between series or between areas is risky. However, their use as indicators of the order of the areas and of the series from shortest to longest duration is very much safer. This table, together with detail appearing above, suggests the following conclusions with respect to duration.

One of the striking facts revealed by table 24 is that cycles in store sales are generally much longer than those in the other series. In only one case is another series longer, Pittsburgh's employment. This difference between store sales and the other series does not arise from different time coverage at all. Rather, it is due to the resistance of consumers to reduced living standards.

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[26] Total months of lag and lead are the same in Los Angeles, but lags occur more frequently; were it not for an eleven months' lead in 1922 associated with an extraordinary boom in construction, there would be a marked total month lag in Los Angeles.

Another interesting matter which these data reveal is that in nearly every case the expansions exceed the contractions in length. Two instances exist (store sales in Cleveland and Pittsburgh) in which contractions are longest; these probably result from the application of the somewhat arbitrary rules for establishing turning points, for the long, gradual recession following the 1923 peaks in these areas was accompanied elsewhere by a high plateau, with no identifiable trough until after 1929. A very slight change in the choice of turning points would give these areas a typical expansion-contraction relationship.

TABLE 24

AVERAGE MONTHLY DURATION OF EXPANSIONS, CONTRACTIONS, AND TOTAL CYCLE IN FOUR SERIES

	Los Angeles	San Francisco	Chicago	Detroit	Cleveland	Pittsburgh
Bank debits						
Average expansion	48.3	29.3	47.3	26.0	43.0	29.5
Average contraction	19.5	19.6	18.0	23.4	21.5	18.6
Average total cycle	67.8	48.9	65.3	49.4	64.5	48.1
Department store sales						
Average expansion	75.0	76.5	51.0	54.0	29.3	28.3
Average contraction	20.3	27.0	32.0	23.0	32.0	30.8
Average total cycle	95.3	103.5	83.0	77.0	61.3	59.1
Power sales						
Average expansion	[a]	45.5	37.8	35.6	[a]	[a]
Average contraction	[a]	34.7	22.3	22.8	[a]	[a]
Average total cycle	[a]	80.2	60.1	58.4	[a]	[a]
Employment						
Average expansion	[a]	[a]	40.3	28.7	35.0	37.5
Average contraction	[a]	[a]	20.5	20.4	22.0	22.0
Average total cycle	[a]	[a]	60.8	49.1	57.0	59.5

SOURCE: Derived from data in appendix ii.
[a] Noncomparable series; shortness of series distorts measure of duration.

Third, high rates of growth in an area, regardless of the method of measurement employed, do not guarantee that cycles will tend to be either especially long or especially short. Neither Los Angeles nor Detroit, areas growing rapidly, consistently display long or short durations. Further, areas in which growth has ceased, or in which growth is slow, fail to display either especially long or especially short cycles. Cleveland, Pittsburgh, and Chicago bear this out.

Fourth, there is some evidence to indicate that Pittsburgh, a durable

producers' goods area which concentrates in production at a stage far removed from the consumers' level, and in fact what might be called a manufactured raw materials area, has relatively short cycles in general.

Fifth, differences between average cyclical duration measured by the four series in the same area are least in Cleveland and Pittsburgh. The similarity of these two areas and their divergence from the others may stem from the predominant influence of manufacturing operations on the economy of the two centers. Except in department store sales, Detroit resembles Cleveland and Pittsburgh. In cities where finance and merchandising, particularly wholesale trade, are relatively more significant, a greater variety in cyclical reaction is manifested.

Finally, and most important, specialization in manufacturing, or in any particular type of manufacturing, does not in itself seem to be sufficient to guarantee any particular relative duration. Cycles are much too complex phenomena, and their causes too diverse to permit simple generalizations to suffice as explanations for divergent durations. Each series and each cycle in each area demands individual study.

Conclusions: Timing

Early in this chapter, a statement of the sequence to be expected in cyclical timing was presented. This statement was based upon the *a priori* theory of cyclical fluctuation and upon the examination of certain national statistical series.

About the only conclusion which may be drawn from this chapter in support of this analysis by Professor Clark is that automobiles do show a consistent lead as reflected in the lead of employment in Detroit at nearly every turning point. It may be possible to support Clark on the basis of the timing of the employment series a little further. Cleveland, a durable producers' goods center, very often leads most other areas and is frequently second only to Detroit. It is unfortunate that data are not available to allow a comparison of the western areas with the eastern over the entire period, for it would be possible, if such data were available, to test the expected sequence further.

The employment series generally behaves in a manner much more consistent than the others, undoubtedly because it reflects activity in each area of a specific type of manufacturing. The other series, and especially bank debits, are a consequence of the reaction of many economic activities. They show no such consistent pattern as employment. In department store sales, the turning point positions in the areas shift frequently between 1920 and 1940. Perhaps it is possible to argue that San Francisco lags, but such a conclusion is by no means completely defensible. Bank debits and power sales offer nothing to support the

general theory of cyclical sequence, the latter possibly because of the almost insoluble problem of seasonal adjustment in Detroit and because of the lack of comparability between San Francisco and the other areas. At peaks in which activity in security markets is an important factor, bank debits in San Francisco and Chicago tend to lead; whenever the crisis is unaccompanied by speculative financial operations, this tendency becomes much less obvious.

The one generalized conclusion that can be made on the basis of the data presented in this chapter is that the evidence does not support the belief that business cycles travel from East to West and that, therefore, in general the western areas lag. One other study has taken this position, and the data presented therein cover a part of the period examined here.[27] Though the data used in the study mentioned, like those of the present study, fall short of the ideal and though the period covered is quite brief, it would seem that the conclusion, "there is no basis whatever . . . for the opinion that fluctuations in general business occur first in the East, then in the Middle West, and finally in the Pacific Northwest" is substantiated by the present study. There certainly is no basis for the opinion that fluctuations in general business as measured by such series as bank debits occur first in the East and then in the West. Any conclusion that more specific business conditions move from East to West must definitely be limited and can be valid only with respect to specific eastern areas compared to specific western ones.

The discussions and materials presented in this chapter indicate rather clearly that, so far as turning points and duration are important, business cycles are diverse and that the statistical study of business cycles based upon general national series may well lead to serious error as a consequence of the fact that the time series utilized may not be representative. It is certain that the method of study employed in this investigation is subject to the same criticism as that levied here against the study of cycles based upon national data. The series which are utilized represent, for example, employment in manufacturing, but very diverse reaction to underlying causes is unquestionably reflected in the individual components of the total employment series. A different picture of business cycles, complicated but possibly more enlightening, might well be revealed through the examination of data of narrower coverage. The fact that employment, bank debits, department store sales, and power sales indicate differences in timing and duration within a single area and differences between different areas suggests the necessity of yet more intensive research.

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[27] Cf. J. Demmery and F. Ritchie, "The Westward Lag in Business," *Journal of Business of the University of Chicago*, Vol. 7, No. 2 (April, 1934), pp. 173–181.

CHAPTER IV

THE AMPLITUDE OF AREA CYCLES

TWO TECHNIQUES are employed in this study as measurements of the amplitude of fluctuations in the individual series and in establishing differences in amplitude between the areas. Both have been illustrated in chapter i. They consist, first, of the percentage change between successive turning points in the trend-adjusted data and, second, of measurements of the dispersion of the individual trend-adjusted values around their own mean. The second measure of amplitude also provides indication of the pattern of change, "pattern" being used here to mean the various rates of change that characterize the phases of the cycle, thus contributing information additional to that provided by percentage change alone. Since chapters vi and vii will be a comprehensive investigation of cyclical patterns in the industrial areas, the present one will be confined to the less refined, but nevertheless significant, measure, percentage change.

POSTWAR ADJUSTMENTS AND THE MIDDLE 'TWENTIES

Table 25 and the upper series of chart 8 (Bank Debits: Turning Points and Amplitude) present material on the comparative amplitude of fluctuations in the areas studied. The table shows specifically the percentage change by comparable cycles. The unusual characteristics of the first post-World War I cycle, as compared to those following in the decade of the 'twenties, are immediately apparent. First, all areas experienced a sharp setback terminating either in 1921 or early in 1922, whereas in the later years the movement was not always reflected in all areas. Second, the decrease varies substantially between the areas, a 46 per cent in Detroit, but only 13 per cent in Los Angeles. In later years, the spread narrows considerably. This recession seems to be a reasonable presentation of the postwar shakedown which follows inflationary war finance and shortages of particular items, both consumers' and producers' goods.

Between the summer of 1920 and the end of 1921, wholesale prices declined by more than 40 per cent, from a peak of well over 160 (1926 = 100) to a trough of little more than 90 in the early spring of 1922. This price decline alone is sufficient to account for severe debit decline. The conclusion is not that there is a single cause, but rather that it is a prime cause. Between 1920 and 1921, national physical output of manufacturing industries declined only 19 per cent,[1] and freight traffic, measured by

[1] Solomon Fabricant, *The Output of Manufacturing Industries, 1899–1937* (New York, National Bureau of Economic Research, 1940), p. 44.

revenue ton miles decreased only 25 per cent.[2] The more rapid recession in prices compared with output indicates clearly that the debit decline, ranging up to 46 per cent, is more closely linked to price change.[3]

One writer has noted that a peculiarity of this national downswing was the unusual stability of consumer spending; this, along with booming construction, sufficed to convert the recession into a rather early recovery.[4] The evidence suggests that this was not universally so in the six areas, for in Los Angeles, Cleveland, and Pittsburgh (three of four areas for which sales and debit data both are available for this cycle) department store sales declined first (chart 8). Only in San Francisco was this sequence reversed. Nevertheless, in most cases the decline in debits was greater than in sales (compare tables 25 and 26), except in Los Angeles where the debit decrease was only 13 per cent, and the sales decline slightly more.

In chapter iii the role of construction between 1920 and 1921 in Los Angeles was mentioned; here again this industry appears to be a decisive factor, for there is little evidence of a recession more than two or three months long in construction. This industry apparently bolstered up activity sufficiently to maintain debits at very high levels in spite of more severe downswings elsewhere. It even maintained debits above store sales which were a stabilizing factor themselves nationally and in other areas. However, the stabilizing effect of construction in Los Angeles can be overemphasized, for reference to chart 1, chapter i shows manufacturing activity in the area to be nearly constant. In Detroit and Pittsburgh, though, sharp decreases were registered. In these areas, trend-adjusted value added by manufacture declined 47 and 44 per cent, respectively, between 1919 and 1921; in Los Angeles the decline was less than 1 per cent.[5] This differential variation in manufacturing is partly explainable by the familiar acceleration principle, which accounts for typically wider fluctuations in producers' goods industries (and sometimes the opposite movement of producers' and consumers' goods industries) than in others.[6]

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[2] National Industrial Conference Board, *The Economic Almanac, 1945–46* (New York, 1945), p. 256.

[3] The decline in national trend-adjusted debits was 28 per cent.

[4] S. H. Slichter, "The Period 1919–1936 in the United States: Its Significance for Business Cycle Theory," *Review of Economic Statistics*, Vol. XIX, No. 1, p. 8.

[5] Output of steel ingots and steel for castings in Allegheny County (a major part of the Pittsburgh industrial area) adjusted for trend, itself, declined 50 per cent between the 1920 peak and 1921, and then increased 91 per cent to the 1923 peak. (From data published by the Bureau of Business Research, University of Pittsburgh, in the *Industrial Databook for the Pittsburgh District* (Pittsburgh, 1936), p. 30, and a special tabulation prepared by the American Iron and Steel Institute). In the machine-tool industry, one which is very important to Cleveland, the recession to the 1921 trough was 82 per cent, again on a trend-adjusted basis. (*Survey of Current Business, 1940 Supplement*, p. 139.)

[6] For a comprehensive statement of this principle, see G. Haberler, *Prosperity and Depression* (Geneva, 1938), pp. 80–98.

TABLE 25

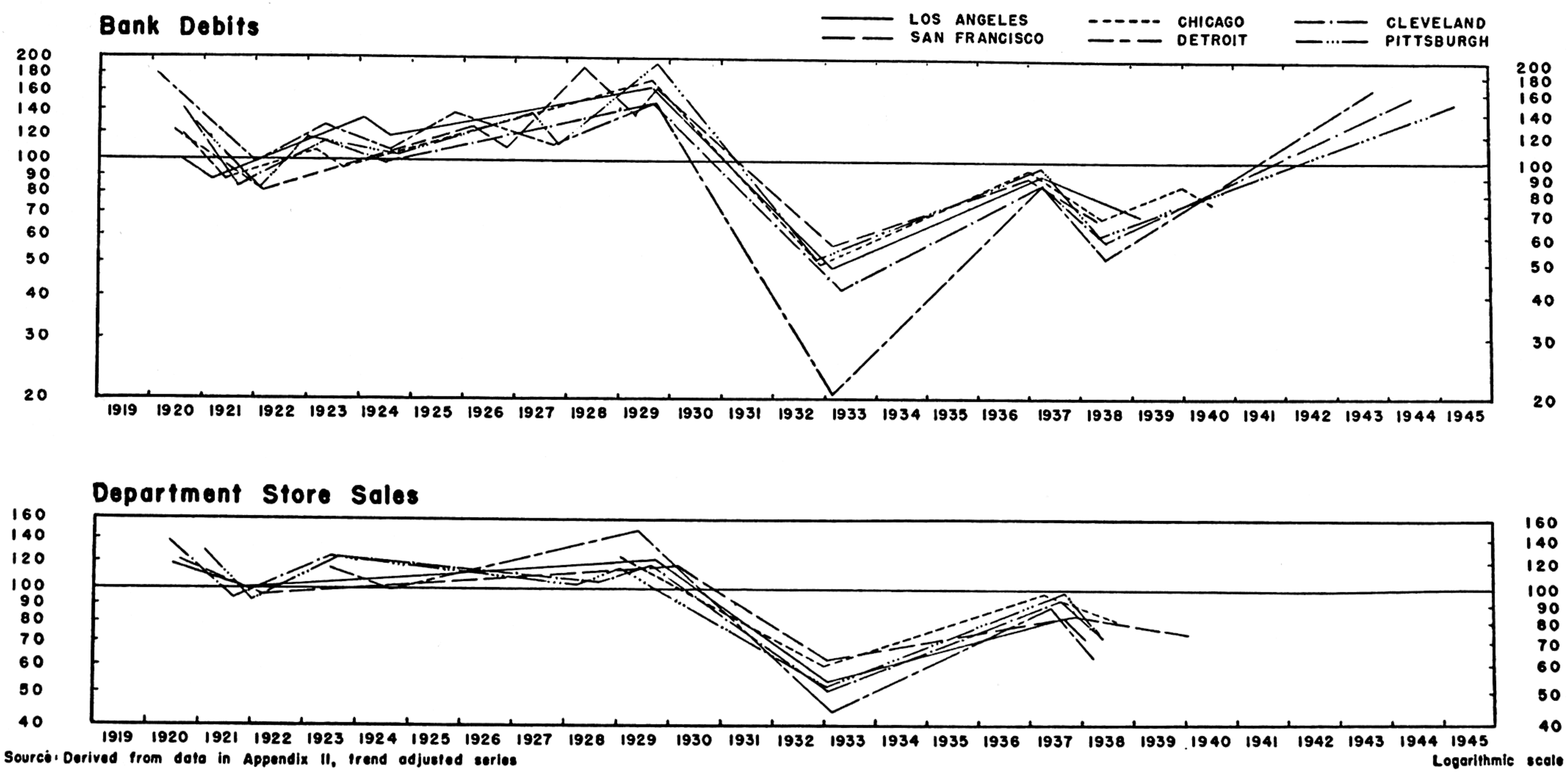
PERCENTAGE CHANGES IN ADJUSTED BANK DEBITS IN SELECTED AREAS, 1921–1945

Turning-point date	Phase ending	City	Increase or decrease (per cent)	Explanatory remarks
1921, 1922	T	Detroit	−46	
		Cleveland	−41	
		Pittsburgh	−36	
		San Francisco	−33	
		Chicago	−27	
		Los Angeles	−13	
1923, 1924	P	Los Angeles	52	San Francisco omitted. Turning point occurred more than fifteen months later
		Pittsburgh	42	
		Cleveland	35	
		Detroit	29	
		Chicago	21	
1923, 1924	T	Detroit	−16	San Francisco omitted. Turning point occurred more than fifteen months later
		Cleveland	−13	
		Los Angeles	−11	
		Pittsubrgh	−10	
		Chicago	−10	
1925, 1926, 1927	P	San Francisco	54	These represent peaks of extra cycles
		Pittsburgh	31	
		Detroit	28	
1926, 1927	T	Detroit	−19	These represent troughs of extra cycles
		Pittsburgh	−18	
		San Francisco	−13	
1929	P	Chicago	83	
		Cleveland	51	
		Los Angeles	40	
		Detroit	34	
		Pittsburgh	27	
		San Francisco	20	
1932, 1933	T	Detroit	−86	
		Cleveland	−72	
		Chicago	−72	
		Los Angeles	−71	
		San Francisco	−65	
		Pittsburgh	−64	
1937	P	Detroit	315	
		Cleveland	102	
		Chicago	90	
		Pittsburgh	87	
		Los Angeles	87	
		San Francisco	57	
1938, 1939	T	Detroit	−39	
		Pittsburgh	−37	
		Cleveland	−30	
		Chicago	−28	
		San Francisco	−24	
		Los Angeles	−24	
1943, 1944, 1945	P	Detroit	218	Other areas did not have turning points at this time
		Cleveland	169	
		Pittsburgh	150	

SOURCE: Derived from data in appendix ii. Data are adjusted for trend and seasonal variation.

CHART 8

Amplitude between Turning Points in Bank Debits and Department Store Sales, Selected Areas, 1919-1945



Source: Derived from data in Appendix II, trend adjusted series

Logarithmic scale

The relatively violent recession and recovery in Cleveland and Pittsburgh, therefore, are not surprising.

The recovery from this postwar trough shared certain peculiarities with the preceding recession. Increases in debits ranged from 21 per cent in Chicago to more than two and one-half times that figure in Los Angeles. The increases from this trough seem to be unrelated to the previous decline (It should be noted that comparisons of per cent increase and decrease in the same series are invalid, for per cent decrease is limited to 100. Comparative position of the areas in the downswing and the upswing can, however, be derived from these data.): Los Angeles declined least from 1920 and increased most from 1921; Detroit decreased most and increased next to least. Only the western area recovered its previous postwar peak in debits. Prices again are a basic cause for this low degree recovery in debits, for they remained fairly constant throughout the remainder of the decade, never recovering their 1920 levels. By 1922, manufacturing output had surpassed 1920, and in 1923 it was far higher. After this cycle ending with the peak of 1923, price level changes ceased to affect debits severely (and other series, too) because of their relative constancy to the end of the decade. Many of the characteristics differentiating this cycle from others, especially its asymmetry, are due to the violence of the accompanying price changes. The variations between the areas in this cycle must be assigned to other causes, such as differential construction fluctuation and variance in the reaction of manufacturing in this postwar readjustment period.

Beginning in early 1923 (early 1924 in Los Angeles), a downswing began which terminated in 1924. This recession is noticeable in debits, employment, and power sales, but is not reflected in store sales except in Detroit. The downswing in store sales in Cleveland and Pittsburgh is not comparable since it did not end until 1928. The following table shows that it was a comparatively mild recession. The percentage decreases in the series in the areas where this cycle is distinguishable were:[7]

Area	Debits	Store sales	Employment	Power sales
Los Angeles	−11	....	....	....
San Francisco	....	....	....	−12
Chicago	−10	....	−14	−16
Detroit	−16	−13	−21	−34
Cleveland	−13	....	−20	....
Pittsburgh	−10	....	−24	....

This particular cyclical phase appears only in debits in Los Angeles and

[7] From table 25 through table 28.

TABLE 26

PERCENTAGE CHANGES IN DEPARTMENT STORE SALES IN SELECTED AREAS, 1921–1940

Turning-point dates	Phase	Area	Increase or decrease (per cent)	Explanatory remarks
1921, 1922	T	Cleveland....	−32	Chicago and Detroit omitted. No turning points at this time
		Pittsburgh....	−28	
		San Francisco	−21	
		Los Angeles...	−15	
1929, 1930	P	Detroit.....	50	Chicago omitted, since it had no previous turning point with which to compute percentage change
		Los Angeles...	22	
		San Francisco	20	
		Cleveland....	12	
		Pittsburgh....	12	
1933	T	Detroit.....	−70	
		Cleveland....	−57	
		Los Angeles...	−56	
		Pittsburgh....	−55	
		Chicago.....	−52	
		San Francisco	−46	
1937	P	Detroit.....	101	
		Pittsburgh....	88	
		Cleveland....	84	
		Chicago.....	63	
		Los Angeles...	53	
		San Francisco	35	
1938, 1940	T	Detroit.....	−29	
		Pittsburgh....	−26	
		Cleveland....	−22	
		Chicago.....	−16	
		Los Angeles...	−13	
		San Francisco	−11	

SOURCE: Derived from data in appendix ii.

in power sales in San Francisco, but it is possible that a similar movement would occur in employment if data were available for this period. Only in Detroit, however, does it reveal itself in all series, and this, combined with the low percentage decreases, attests to its moderate character.[8] It is doubtful if the differences which these data reflect are large enough

[8] Further indication that these were distinctly minor movements is the fact that automobile production adjusted for trend declined only 12 per cent. Normally, this industry fluctuates violently.

to be significant, though there is some likelihood that the relatively small decrease in employment in Chicago as compared with Pittsburgh (whereas their debits decreased the same amount) is due to a lesser decline in nondurable, as opposed to durable, goods production.

Slichter attributes this downswing to a lack of confidence in the existing price level, believing that the sole cause was pessimism with respect to existing prices, a pessimism arising from the heavy losses experienced in the disastrous price collapse of 1920–1921.[9] The data in tables 25 and 26, and in chart 8, support this contention. A discernible dip in store sales did not occur at this time, though, to be sure, sales sagged downward until 1928 in Cleveland and Pittsburgh. This dip, however, is primarily a consequence of the downward trend in price and not a decreased physical volume of sales. Thus, the dip was initiated at a higher stage than the consumers' stage, and in any case it was very short and mild.

Cyclical Change, 1925–1929

The remainder of this earlier decade saw considerable variance among the areas. San Francisco, Pittsburgh, and Detroit experienced another cycle in debits before the 1929 peak; Cleveland and Pittsburgh reached a lower turning point in store sales in 1928; all eastern areas experienced an additional cycle in employment (table 27); and only Detroit, in power sales, showed evidence of the extra cycle (chart 9).

The eastern employment cycle, reaching a trough between the middle of 1927 and the spring of 1928, is the simplest of all to explain. The fact that it is not listed for the West in the tabulation of cycles in employment is probably a consequence of the shortcomings of the data. In Detroit, Chicago, Cleveland, and Pittsburgh, the impact of a major readjustment in the automobile industry, particularly the Ford conversion, was sufficient to cause this movement. The earlier downturn of employment in Detroit (some eight months ahead of the three other areas) is due solely to trend adjustment, for an absolute decrease in automobile production did not come until 1927. This particular cycle is unusual in that it is not reflected by store sales in any area and by debits in only two areas (Detroit and Pittsburgh). The fact that at the time a specific and purely temporary cause for this fluctuation was apparent undoubtedly helped to confine it to employment. Consumers did not react in the usual way but continued to buy, thereby stabilizing store sales and dampening other manifestations of cyclical variation substantially.

Looking backward, a prelude to the collapse of 1929 is discernible as early as the spring of 1928. At that time, San Francisco's debits reached an all-time peak which terminated an exceedingly rapid eighteen-month

[9] Slichter, *op. cit.*, p. 8.

TABLE 27

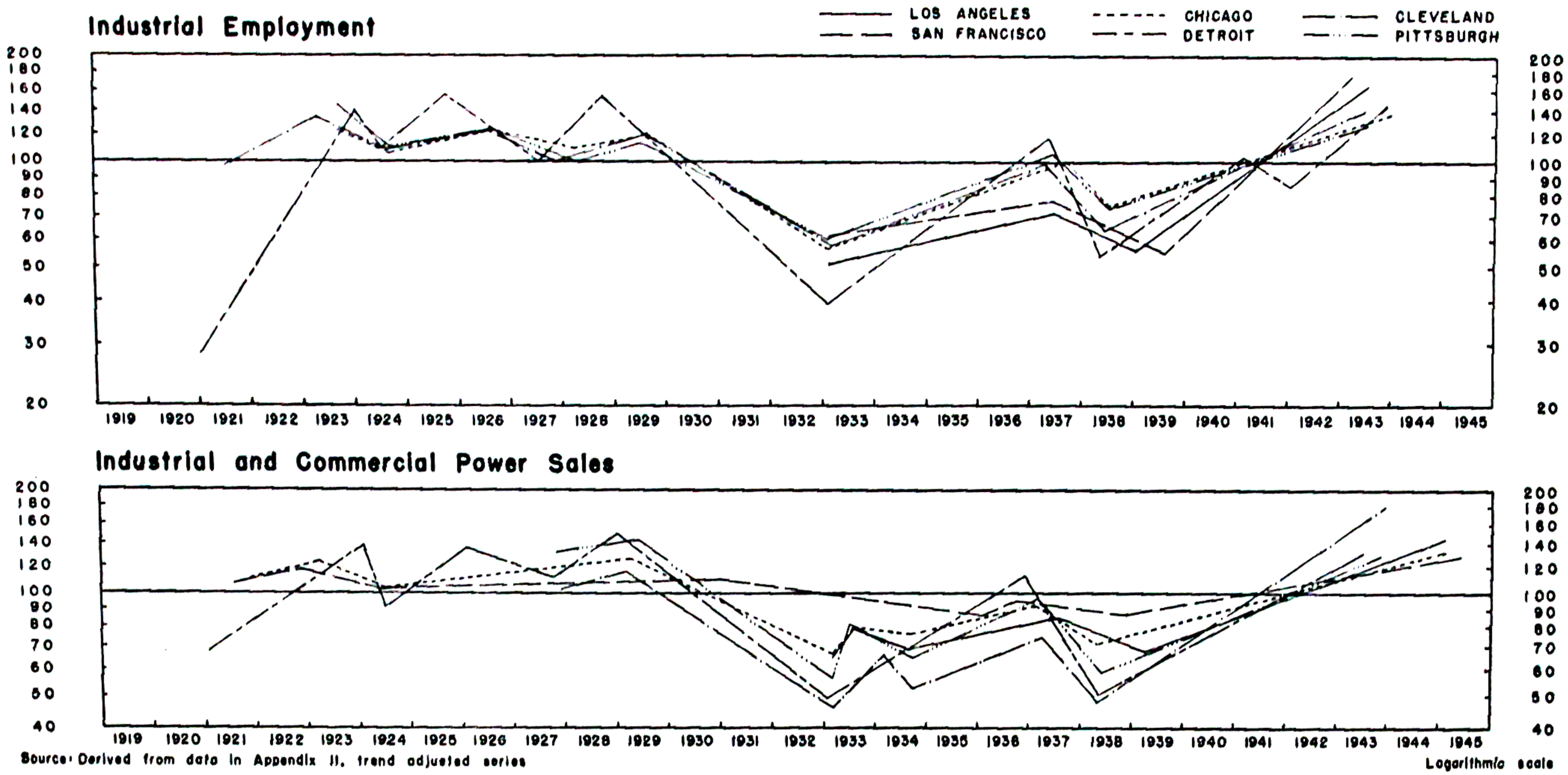
PERCENTAGE CHANGES IN INDUSTRIAL EMPLOYMENT IN SELECTED AREAS, 1924–1943

Turning-point dates	Phase	Area	Increase or decrease (per cent)	Explanatory remarks
1924	T	Pittsburgh....	−24	Los Angeles and San Francisco omitted; no turning points until 1937
		Detroit.....	−21	
		Cleveland....	−20	
		Chicago.....	−14	
1925, 1926	P	Detroit.....	42	Los Angeles and San Francisco omitted; no turning points until 1937
		Chicago.....	15	
		Cleveland....	13	
		Pittsburgh....	12	
1927, 1928	T	Detroit.....	−35	Los Angeles and San Francisco omitted; no turning points until 1937
		Pittsburgh....	−19	
		Cleveland....	−17	
		Chicago.....	−11	
1928, 1929	P	Detroit.....	53	Los Angeles and San Francisco omitted; no turning points until 1937
		Cleveland....	20	
		Pittsburgh....	13	
		Chicago.....	8	
1933	T	Detroit.....	−74	Los Angeles and San Francisco omitted; no turning points until 1937
		Chicago.....	−52	
		Cleveland....	−52	
		Pittsburgh....	−46	
1937	P	Detroit.....	197	
		Chicago.....	78	
		Pittsburgh....	75	
		Cleveland....	71	
		Los Angeles...	40	
		San Francisco	26	
1938, 1939	T	Detroit.....	−54	
		Cleveland....	−35	
		Pittsburgh....	−30	
		San Francisco	−29	
		Chicago.....	−25	
		Los Angeles...	−22	
1943	P	San Francisco	221	
		Los Angeles...	200	
		Cleveland....	119	
		Chicago.....	83	
		Pittsburgh....	75	
		Detroit.....	70	

SOURCE: Derived from data in appendix ii.

CHART 9

Amplitude between Turning Points in Industrial Employment and Industrial and Commercial Power Sales in Selected Areas, 1919-1945



Source: Derived from data in Appendix II, trend adjusted series

Logarithmic scale

recovery. This debit peak, absent elsewhere, was associated with a five-fold increase in security transactions over the previous year and with record loans and investments in securities by Federal Reserve member banks in San Francisco. The debit series broke sharply in April, 1928, and continued downward for exactly a year. Thereafter, some recovery took place, but it lasted a mere five months. Early in 1929, department store sales in Chicago and Detroit began slipping. Employment began moving downward in Detroit in October, 1928, but elsewhere in the East the downturn was delayed some nine months. Power sales likewise moved downward months ahead of the stock market crisis in October of 1929. By the end of that year, however, with two minor exceptions, all the series utilized in this study had definitely entered a recession phase. This uniformity of reaction in the areas at the peak, together with the violence of the subsequent downswing, marks this cycle as unique. Its uniqueness by no means rests solely upon these factors, for, unlike many downturns, it was preceded by a long period in which prices tended downward, by three years of declining construction, and by years of falling and depressed values of farm real estate and of forced sales of such property. In addition, the external aspects, as compared with the purely domestic ones, rank much larger than heretofore.

In order to illustrate clearly the fact that this 1929 boom represents one of unusual magnitude in all areas, the following data present the percentage increase in all areas in unadjusted and in trend-adjusted bank debits between the 1921 or 1922 trough and the peak in 1929.

Area	Adjusted	Unadjusted
Los Angeles	89	97[a]
San Francisco	101	157
Chicago	95	125
Detroit	52	196
Cleveland	77	111
Pittsburgh	74	89

[a] Calculated from the 1921 average monthly value. No trough is identifiable in the unadjusted data.

Trend adjustment over this period naturally depresses the amount of increase, especially in Detroit where the trend is extraordinarily steep; even so, the increase in the adjusted series ranged from 50 to 100 per cent, but the increase in the unadjusted series ranged between 90 and nearly 200 per cent.

The increase in debits is all the more impressive when the downward course of commodity prices over the same period is considered. This

TABLE 28

PERCENTAGE CHANGES IN INDUSTRIAL AND COMMERCIAL POWER SALES IN SELECTED AREAS, 1922–1945

Turning-point dates	Phase	Area	Increase or decrease (per cent)	Explanatory remarks
1922, 1923, 1924	P	Detroit	103	Other areas did not have turning points at this time
		Chicago	12	
		San Francisco	10	
1924	T	Detroit	−34	Other areas did not have turning points at this time
		Chicago	−16	
		San Francisco	−12	
1929	P[a]	Detroit	35	Chicago and San Francisco omitted. Turning points diverged by more than fifteen months. Los Angeles had no turning point at this time
		Cleveland	13	
		Pittsburgh	9	
1933	T	Detroit	−67	San Francisco omitted. Its turning point occurred more than fifteen months later. Los Angeles omitted. No previous peak could be identified
		Pittsburgh	−61	
		Cleveland	−60	
		Chicago	−47	
1933, 1934	P	Pittsburgh	45	San Francisco and Detroit had no cycle
		Cleveland	43	
		Los Angeles	22	
		Chicago	19	
1934	T	Pittsburgh	−21	San Francisco and Detroit had no cycle
		Cleveland	−20	
		Los Angeles	−13	
		Chicago	−11	
1936, 1937	P	Detroit	129	San Francisco omitted. Its initial turning point occurred more than fifteen months later
		Pittsburgh	49	
		Cleveland	41	
		Chicago	29	
		Los Angeles	23	
1938, 1939	T	Detroit	−55	
		Pittsburgh	−39	
		Cleveland	−36	
		Chicago	−22	
		Los Angeles	−20	
		San Francisco	−9	
1943, 1945	P	Cleveland	276	
		Detroit	159	
		Pittsburgh	120	
		Los Angeles	111	
		Chicago	85	
		San Francisco	48	

SOURCE: Derived from data in appendix ii.
[a] Computed from 1927 trough.

increase cannot be attributed to price change, but rather to more basic changes. This does not mean that security speculation and its price inflation did not play a part. In fact, everything points toward exceedingly precarious conditions in the money markets; interest rates were very high, new issues were increasing, and loans to brokers and other loans on securities reached all-time records. Nevertheless, the rise in debits must be assigned additional causes, for the volume of funds employed in financial markets never represents more than a small portion of that in other uses.[10] The tremendous increase in the physical output of industry, agriculture, and of services must be primarily responsible. As pointed out by others, these circumstances together are seldom found in a prosperity phase; they are distinctly atypical, and are directly contrary to what might be anticipated on the basis of traditional cyclical theories.[11]

Crisis and Collapse, 1929–1933

The magnitude of the collapse, of course, is linked to the extent of the strain imposed on the system by the events of the 'twenties, and especially to a progressive deteriorating of international economic relationships. The role of the security markets too frequently has been overemphasized, and it is doubtful if even the crisis of October, 1929 was solely a financial phenomenon. The restrictive central bank policies of 1928 and 1929 could hardly have been particularly depressing to speculators, but they unquestionably exerted profound effects upon other business operations. Especially significant were the effects of restrictive credit policy on foreign lending by the United States in 1928 and 1929 and the consequent curtailment of foreign purchases of American goods. Private long-term capital exports began decreasing in 1928, and in 1929 they were down to 137 million dollars, approximately one fifth of their 1928 level; total capital exports declined 75 per cent between 1928 and 1929. In these years, 1927, 1928, and 1929, exports of such important items as cotton, wheat, automobiles, and machinery likewise began to fall off. Added to a falling foreign demand for American products were the depression in residential building and a high degree of stability in consumer purchases. Domestic investment, on the contrary, did not appear to be depressed in these years, what with new security issues at all-time highs and some new investment in nearly all business. In connection with this, department store sales, unadjusted for trend, failed to increase after the summer of 1928 and even declined in some areas.

Whatever the conjuncture of circumstances leading to the crisis and

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[10] Cf. M. A. Copeland, "Tracing Money Flows through the United States Economy," *American Economic Review*, Vol. 37, No. 2 (May, 1947), p. 42.

[11] Cf. Slichter, *op. cit.*, p. 12; Schumpeter, *Business Cycles*, Vol. II, p. 809; and R. G. Hawtrey, *Capital and Employment* (London, 1937), p. 74.

downswing thereafter, this turning point marks the end of a very prosperous era, one supported by what seemed to be an almost insatiable market for the products of an American economy (a market maintained, however, by enormous dollar loans), which itself was carrying output far beyond levels expected only a few years earlier. It is true that the era following World War I was punctuated by business cycles, but after the first postwar readjustment, these were neither severe nor were they universal. They involved for the economy as a whole either more or less prosperity, never real depression.

The downswing following 1929 greatly exceeds in magnitude the previous ones, for which data are presented in this study. Whereas in earlier cycles some areas had comparatively small decreases, between 1929 and 1933, in the series utilized in this study, no area decreased less than 64 per cent (adjusted) and Detroit decreased 86 per cent. This decrease, as that of 1921, was virtually economy wide and was accompanied by extremely violent price contraction. But, though these two downswings had this much in common, they were very different in amplitude. The percentage decreases of the trend-adjusted bank debits were:

Area	1921, 1922 trough	1933 trough
Los Angeles	−13	−71
San Francisco	−33	−65
Chicago	−27	−72
Detroit	−46	−86
Cleveland	−41	−72
Pittsburgh	−36	−64

Thus, it might be said that the later downswing was approximately 1.7 times as great in Pittsburgh, Cleveland, and Detroit; 2.0 and 2.7 times as great in San Francisco and Chicago, respectively; and 5.5 times as great in Los Angeles. In addition, it should be remembered that this downswing was far longer in duration than the earlier one.

Trend adjustment, furthermore, has not done any special violence to the data. This downswing from 1929 to 1933 appears to be very nearly as great in the raw, unadjusted series as in the processed data, for the percentage decrease in unadjusted bank debits varies between 63 per cent in Cleveland and in Pittsburgh to 81 per cent in Detroit. Cleveland is the only area in which adjustment shifts this decline conspicuously; when unadjusted data are examined, this area appears stable as compared with the other areas, but adjustment makes it appear unstable. Thus, regardless of the method of measurement, this downswing was very

severe, much more so than earlier ones. Even the area with the smallest recession between 1929 and 1933 decreased more than any area had since 1919.

This recession's magnitude differed from earlier ones in another important respect. It appears to be more uniform between the different areas, more so at least than other recessions; in Pittsburgh, where the percentage decline was least, it was still 74 per cent of the greatest decline, Detroit. In 1921 this figure was 28 per cent. In no other downswings were all the areas represented, a fact which in itself is significant,

TABLE 29

PERCENTAGE DECLINE IN TREND-ADJUSTED ANNUAL AVERAGES, ALL SERIES, 1929–1933

Area	Bank debits	Department store sales	Industrial employment	Power sales
Los Angeles	56	43	[a]	[a]
San Francisco	49	32	[a]	[b]
Chicago	53	39	40	31
Detroit	71	55	59	50
Cleveland	60	42	38	40
Pittsburgh	49	41	31	39

SOURCE: Derived from data in appendix ii. Adjusted for 1929–1939 trend. The trough was not 1933 in all cases, but in order to preserve comparability with biennial census data, this decline was computed to 1933.

[a] No turning point prior to 1933.

[b] Trough more than fifteen months later than latest other area.

and in no cases was this percentage so high. Also, there appears to be great uniformity in the decline (between the series) as reference to tables 25 through 28 will reveal. For ease of comparison, table 29 presents the percentage decline in the yearly averages of the four series adjusted for the 1929–1939 trend in each area between 1929 and 1933. It is certainly unfortunate that complete data are not available for Los Angeles and San Francisco, but even without such data, table 29 provides a good illustration of the point at issue. All series did move downward violently. At no other time is this so clearly the case, though, if all of the series were available for the first downswing (1921), it is very possible that it, too, would reflect some of this same uniformity.

The magnitude of this decline is in part a consequence of the fact that it spread into or was reflected in national and world banking and monetary conditions. It is true, certainly, that no cycle fails to affect monetary systems in some degree, but in this case the effects were extremely aggravated. Repetition of the familiar story of the disintegration and final breakdown of international economic equilibrium following 1929 is unnecessary here. Suffice it to say that the world prosperity of the

'twenties was built upon "an expansion of credit and large international loans that seemed to achieve miracles that economists had declared impossible."[12] The miracles worked by these "stop-gap" measures proved to be definitely of transitory nature, however, and once under way, the international financial crisis spread rapidly. The controls introduced by all major nations thereafter in the attempt to achieve insulation from external shocks served to dry up capital movement and the flow of international trade rapidly.

In addition to the consequences of these international problems, the economy of the United States was driven downward by the near collapse of the American banking system. Between 1929 and 1931 the number of bank suspensions in the United States increased fourfold, and by 1933 more than six times as many banks failed as in 1929.[13] Table 30 presents indexes of deposits of suspended banks between 1929 and 1939 in the United States and the various states in which the areas studied lie. The fact that, during the earlier years of the 'twenties, failures very seldom exceeded those in 1929 makes the increase in suspensions thereafter seem even more impressive. It is impossible, of course, to argue that the increase in bank failures was either a cause or an effect. Instead it was unquestionably both, and probably at the same time; but this phenomenon did not occur in such aggravated form in earlier cycles, and the wholesale failure of banks could hardly be expected not to accentuate the downswing once it was under way.

Table 30 shows that a decided differential existed between the areas with respect to the rate of increase in the importance of bank failures as measured by deposits of suspended banks. By 1931 they had increased seventy times in Ohio compared with forty-five times in Michigan and only three times in California. By 1933, deposits of failed banks in Michigan were nearly 350 times those in 1929 and eight times in 1931. In California these failures in 1933 were five times those two years earlier; elsewhere the increase was much less, and in Illinois they actually declined somewhat in this biennium. Michigan and Ohio had the poorest experience of the states listed. The rate of deterioration was most rapid in 1931 in Ohio, but in 1932 and 1933 Michigan moved downward far more rapidly. The causes of this banking collapse are many, such as gross incompetency of some bankers, a superfluity of small independent banks, an agricultural depression, and a decentralized system of regulation, but it could not have reached such proportions had not a major cyclical downswing in business generally occurred.

The decided differences between the states with respect to banking

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[12] J. B. Condliffe, *The Reconstruction of World Trade* (New York, 1940), p. 73.
[13] Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, 1943), p. 284.

experience was not carried over into other series used in this investigation. Perhaps Detroit owes its relatively violent movement in part to Michigan's banking difficulties, but the fact that the California areas showed little comparative stability (table 29), in spite of relatively favorable banking experience, suggests that other factors exerted somewhat more effective force. Banking collapse did contribute to the general violence of the movement, but other factors apparently governed the regional differences.

TABLE 30

INDEXES OF DEPOSITS OF SUSPENDED COMMERCIAL BANKS IN THE UNITED STATES AND IN SELECTED STATES, 1929–1939

Year	United States	California	Illinois	Michigan	Ohio	Pennsylvania
1929 Actual[a]	230,643	4,452	16,872	2,263	3,479	8,128
1929	100	100	100	100	100	100
1930	363	215	363	287	863	765
1931	733	300	1,041	4,544	7,486	3,331
1932	306	453	752	1,606	238	627
1933	1,559	1,614	938	34,812	14,171	4,036
1934	160	.....	2	2	21	14
1935	4	.....	...	2	7	56
1936	5	.....	...	...	54	...
1937	8	.....	4	...	...	4
1938	5	.....	17	1	...	4
1939	15	.....	...	...	...	9

SOURCE: Data derived from Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, 1943), p. 285.
[a] Thousands of dollars.

Employment in Detroit's largest industry, the manufacture of transportation equipment, declined 31 per cent between 1929 and 1933 and only 45 per cent when adjusted for trend, but value added by manufacture in this industry dropped more than 50 per cent unadjusted and nearly 56 per cent when adjusted. This industry accounted for just under 60 per cent of all manufacturing wage earners in Detroit in 1939. Comparing this experience with, for example, employment and value added in all nondurable goods manufacturing in Los Angeles (which accounts for 50 per cent of total industrial employment), makes the general differential instability of Detroit less surprising than might be expected. Employment and value added (unadjusted) declined in Los Angeles by 20 and 50 per cent, respectively; in Pittsburgh these figures for the iron and steel industry (employing 56 per cent of the industrial wage earners) are 34 and 73 per cent, respectively.

Taking Detroit and Pittsburgh alone (for these were the only areas

with comparable concentration in single industries), the data for the percentage decline to 1933 are shown in the table.[14]

	Detroit, transportation equipment		Pittsburgh, iron and steel	
	Employment	Value added	Employment	Value added
Adjusted[a]	45.3	55.8	37.5	74.1
Unadjusted	31.3	51.1	33.8	73.4

[a] Adjusted for 1929–1939 trend.

Thus, between the principal industries in these two areas, there is little difference when employment alone is considered, but fluctuations in value added in the iron and steel industry in Pittsburgh far exceed the decline in value added in Detroit's automobile industry. Additional data show that Pittsburgh's value added instability is due principally to output fluctuation rather than to price change; between 1929 and 1933 output in gross tons of steel ingots and steel for castings declined 74 per cent (adjusted for 1919–1945 trend) and 72 per cent (unadjusted).[15] The accompanying comparative stability of employment in Pittsburgh's iron and steel industry is associated with and confirmed by a very sharp decline in physical output per wage earner, approximately 44 per cent between 1929 and 1933.[16]

Likewise, it appears that the sharp decrease in value added in the automobile industry is a consequence primarily of output instability, for the national physical output of automobiles declined at the same rate as the decline in national factory sales, approximately 65 per cent. Though these data refer to output and sales of automobiles in the United States, whereas the Detroit data refer to transportation equipment generally, the concentration of automobile production in Detroit makes the data sufficiently comparable to be significant.

From the foregoing data the following conclusions seem defensible. First, the cyclical characteristics of the areas are not sufficiently tied to the cyclical characteristics of the principal manufacturing industries to

[14] Data in this and the preceding paragraph were derived from the *United States Census of Manufactures*.

[15] Derived from data in table 14, Bureau of Business Research, University of Pittsburgh, *Industrial Databook for the Pittsburgh District*, p. 30. Data from 1933 through 1945 were provided by the American Iron and Steel Institute.

[16] This value was obtained by dividing total gross tons of steel ingots and steel for castings produced by the average number of wage earners in steel mills and rolling mills in each year, and then by dividing the quotient for 1929 into the difference between the two quotients. The data are from the *Census of Manufacturers* and the *Industrial Databook for the Pittsburgh District*, p. 30. Though the census classification does not refer exclusively to wage earners engaged in the production of ingots, it is unlikely that this invalidates the conclusion significantly.

make the two substantially alike. Generalized measures of this 1929–1933 recession in Los Angeles indicate that it was considerably more severe than the recession in the same period in nondurable goods production which includes its two largest industries. On the contrary, the largest industries in Detroit reflect a downswing somewhat less violent than the measures listed in table 29. Peculiarly in Pittsburgh, though employment in the major industry fluctuates less than the general measures, value added and output fluctuate much more. Thus, the determining cause of the amplitude of local cycles does not seem to be the cycle in an area's major industry, regardless of how predominant that industry may be.

Second, the parallel movement of value and physical output series in steel and automobiles suggests that the familiar belief that monopolistic organization tends to stabilize price and destabilize output is likely to be correct. This general situation is a contrast to conditions surrounding such activities as citrus production in southern California. In this field, stability of physical production and shipments and very unstable price are characteristic, with the result that the value of the product declined 45 per cent and, adjusted for trend, approximately 55 per cent between 1929 and 1933.[17] This situation is also paralleled in the petroleum export industry of Los Angeles, for net exports were quite stable on a tonnage basis, whereas prices were very unstable, with the end result that the value of exports dropped by slightly more than 55 per cent.[18] Though the following matter will be considered more fully later, at this point it is interesting to note that the instability of these export industries is more than likely a significant factor in shaping business cycles in Los Angeles.

Recovery, Recession, and the Upturn, 1933–1939

A sustained recovery from the depression began in most series in the areas early in 1933, though in a few cases it began late in 1932; and in power sales, except for Detroit, it began much later. In all areas, except Detroit and San Francisco, an abortive recovery in power sales began at the common time, the spring of 1933, lasting only a few months. In these cases the beginning of a continuing recovery was postponed until the autumn of 1934. Examination of the unadjusted data reveals that the lateness of sustained recovery in power sales in Los Angeles may well have been in part the consequence of trend adjustment. In Cleveland,

[17] Derived from data published by the California Fruit Growers Exchange in *Statistical Information on the Orange Industry, 1946*, and *Statistical Information on the Lemon Industry, 1946* (Los Angeles, 1946).

[18] Los Angeles Board of Harbor Commissioners, *Annual Report 1939–1940* (Los Angeles, 1940), p. 81, and J. S. Bain, *The Economics of the Pacific Coast Petroleum Industry, Part 2: Price Behavior and Competition* (Berkeley, 1945), chap. vii.

Pittsburgh, and Chicago, however, the unadjusted data show indications of a double trough, with the beginning of the recovery (culminating in 1937) delayed until late 1934. In these three cases, apparently, the delay in the upturn was not a result of trend adjustment. In San Francisco, recovery was delayed until February, 1936, unquestionably a consequence of the peculiar makeup of the power series.

This recovery reflects some very curious aspects, probably as a result of a number of forces peculiar to it. Among these are the violence of the preceding downswing, the new and positive role of governmental operations, the continued international monetary and economic uncertainties, and the preparation for war in Europe, all of which began to have economic significance as early as 1934. Examination of charts 8 and 9 show, however, that this is merely a result of the fact that the trough values were extremely low as compared to the 1929 peaks. Actually the recovery to 1937 was only a partial recovery, for in no cases were the values at the end of the recovery as high as those of 1929. Data unadjusted for trend also reveal the incompleteness of this recovery. National income in 1937 was 19 per cent below 1929 and consumers' outlay 17 per cent lower;[19] although in physical terms output exceeded 1929 levels by the later date, capital formation, total employment, construction, and prices failed to make a full recovery. Unemployment in the later year was sixteen times that of 1929. In charts 8 and 9 the extent to which this recovery fell short of 1929 levels in the areas is perhaps more marked. Even the physical series, power sales and employment, show no cases where 1929 peaks were regained.

Second, when we consider the fact that the increase in store sales reflected in table 31 is, to an important extent, owing to price increase (the Bureau of Labor Statistics index of wholesale prices rose 31 per cent between 1933 and 1937), the validity of the Hansen thesis, that the recovery "was mainly a consumption recovery," becomes doubtful.[20] On the other hand, some support to his position is offered by the much greater recovery in Detroit, for there monthly sales of consumers' durable goods, automobiles, did lead the upswing. In fact, trend-adjusted passenger car factory sales data increased 238 per cent and production, 230 per cent.[21]

Third, in spite of the fact that substantial unemployment of resources existed as late as 1937, and few if any signs of important bottlenecks

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[19] S. Kuznets, *National Income and Its Composition, 1919–1938* (New York, 1941), p. 137.

[20] Hansen, *Full Recovery or Stagnation*, p. 274.

[21] Derived from data provided by the Automobile Manufacturers Association, from Eaton Manufacturing Company, *A Chronicle of the Automobile Industry in America, 1892–1936* (Cleveland, 1936), and J. G. Glover and W. B. Cornell, *The Development of American Industries* (New York, 1941), p. 700.

existed, prices moved upward at a very rapid pace in 1933 and 1934 and again in 1936 and 1937. This situation is as opposite to that which should be expected on the basis of cyclical theory as was the failure of prices to rise in the latter years of the 'twenties. This unusual price rise, which occurred simultaneously with a measurable decline in the velocity of money, was largely a reflection of the various recovery measures of the federal government and of the effect of these measures upon business psychology.[22]

Finally, this recovery, unlike its preceding recession, occurred to a somewhat different degree in the several areas. The percentage increases

TABLE 31

PERCENTAGE INCREASE IN TREND-ADJUSTED ANNUAL AVERAGES, ALL SERIES, 1933–1937

Area	Bank debits	Department store sales	Industrial employment	Industrial and commercial power sales
Los Angeles	97	57	56	40[a]
San Francisco	78	40	35	[b]
Chicago	79	48	59	35
Detroit	199	91	107	70
Cleveland	118	57	50	39[a]
Pittsburgh	93	74	52	49[a]

SOURCE: Derived from data in appendix ii. Adjusted for 1929–1939 trend. 1933 and 1937 are not necessarily the trough and peak years.
[a] An extra cycle appears in monthly data only.
[b] Noncomparable cycle.

ranged in debits from 78 to 199, in store sales from 40 to 91, in employment from 35 to 107, and in power sales from 35 to 70.[23] These wide ranges themselves are an indication of the variety of forces conditioning the recovery.

In many respects the downswing following 1937 resembled this recovery. As in practically every other case, Detroit's per cent decrease was greatest, and in this phase the per cent decrease in Los Angeles or San Francisco was generally least. In spite of its relatively short duration in some areas (measured on a monthly basis), this recession approaches in magnitude the downswing between 1929 and 1933. For example, tables 25 through 28 show that employment in Detroit declined 54 per cent after 1937, and which compares with 74 per cent after 1929; power sales in Detroit decreased 55 and 67 per cent at those times, respectively. Elsewhere the downswing was not so comparable. In Los Angeles, for

[22] Slichter, *op. cit.*, p. 16.
[23] San Francisco's increase is not counted because it includes residential sales and because its turning point is not comparable.

example, debits declined only one third as much in the latter recession, and in store sales the difference is even greater.

In another important respect this downswing resembles both the movement after 1929 and the earlier one beginning in 1920. All three were accompanied by a sharp decline in prices, with the decline in the 1937–1938 period much less accentuated, whereas the fluctuations of the latter 'twenties occurred in a period of relative price stability. In fact, the recovery of prices, following their decrease from the 1937 peak, did not begin until late 1939, long after most measures of business activity turned upward. The similarity in price reaction between these three recessions probably ends with the fact itself, for causes of the specific price change exist for the last which were not present in the earlier ones. These causes also are related to the significance of the government in this recovery, and the associated reaction of business to this factor. Although it is true that the preceding rise of prices from their 1932–1933 lows was accompanied by an increase in bank deposits and currency in the nation, this increase in money was due almost solely to government deficit financing and, only to an insignificant degree, to business borrowing from banks. This factor, combined with the stability or decline in velocity of money, and with an increase in the liquidity of business, suggests that the price rise was in some ways an artificial one which would give way once its causes were removed.

The failure of the western areas to experience as severe a downswing as the eastern ones, like their failure to reflect faithfully all the movements of the 'twenties, is a consequence primarily of their population growth and the resultant stimulus to certain activities: construction, market-oriented manufacturing, and trade and service functions. But in this 1937 recession another force (foreign orders for certain important products of the area such as petroleum products and airplanes and the demand derived therefrom for the products of other local industries) was working to cushion the downswing. Net exports of petroleum products from Los Angeles, though they did not increase, failed to show any significant decline in 1938, and average employment in aircraft and nonferrous metals manufactures showed substantial increases.

Only in power sales and employment did a recovery from the 1938 trough terminate in all areas, for in the other series the wartime inflation of prices, pay rolls, and consumer expenditure generally kept the series moving upward through 1945, the last year for which data were processed for this study. The magnitude of this upswing and its duration are so clearly related to the wartime production and financial program that little more than mere recognition of this phase is worth-while here. Deserving of somewhat more than this passing recognition is the retooling recession

reflected by Detroit's employment in 1941, the short recession in Chicago's bank debits in the first half of 1940, and the downturn of debits in Detroit, Cleveland, and Pittsburgh in 1943, 1944, and 1945, respectively. Detroit's unique recession is assignable to a specific cause, the conversion of that area from a purely civilian goods production center to a center from which came enormous quantities of military equipment. The extent to which mechanization had been carried in earlier years necessitated a complete shutdown of many establishments during the conversion process. As in 1927, the fact that the cause was well known, and its duration strictly limited to the period necessary for technical changes, confined this recession to employment only.

The second unusual movement in this period, Chicago's debit decline in 1940, is a reflection of a sharp decline in stock prices and in the volume of trading. Beginning in May, 1940, trading decreased rapidly so that the volume of shares traded in 1940 was approximately 20 per cent below the 1939 level.

Third, the wartime downturn of debits in Detroit, Cleveland, and Pittsburgh deserves special comment. This decline in these very specialized areas is due principally to the fact that their output, though no longer increasing to meet wartime needs, could not remain at as high levels or expand further in response to growing civilian needs. Shortages of materials and, the fact that, in Cleveland especially, producers' goods for manufacturers of civilian goods commanded no market until other requisite resources could be released are factors responsible for the downturn of debits. Machine tools for the production of such things as toys, shoes, radios, and the like could not be produced and sold in Cleveland, or even elsewhere, until the wartime pressure diminished. In addition, Cleveland's very important automobile parts industry, like Detroit's, was retarded necessarily.

Conclusions

Material presented in this chapter, though perhaps somewhat too detailed to permit easy generalization, does serve to bring out some significant matters. First, nation-wide cyclical changes tend to affect all areas substantially, with only Detroit suffering a cycle consistently greater in amplitude than the others. Cycles that do not affect all areas to the same degree substantially are never associated with a sharp price change, whereas cycles occurring in all areas are always so associated. Thus, a basic element in the definition of "national" cycles must be price variability. A vulnerable price structure must be looked upon in all areas as a danger signal, regardless of geographic location or industrial characteristics.

Second, the magnitude of cyclical swings is not directly, and in a simple manner, related to the industrial pattern of the areas. For example, Pittsburgh, even with its concentration in producers' durable goods, does not generally have abnormally severe cyclical swings. Also, neither Los Angeles nor Chicago, with important nondurable and consumers' goods industries, appears to experience generally milder swings.

Third, cyclical variations do not seem to be associated with price change in the manner usually anticipated. Peaks have not been consistently preceded by rapid price increase, nor are early stages of recovery always periods of price stability. Cycles have occurred in periods of price stability, and prices have moved upward before output has ceased to increase.

Fourth, the magnitude of cyclical change and measurable characteristics of the change (e.g., its reflection in one series as opposed to others) seem to be related to the organization of industry in the area. Where a considerable degree of monopolistic control can be exercised, cyclical variation reflects itself more in output variability and less in price variability. Where activity is more competitive, the reverse appears to hold.

Finally, it seems as if the common theories of cyclical cause do not contribute significantly to the explanation of peculiarities of regional reaction. Not only are the more general explanations, such as overinvestment or underconsumption, of little use, but the more particular theories of sequence, such as the acceleration principle, fall short of general application. The fluctuations that have been examined in this chapter, though they may well have an underlying common cause, seem often to be so significantly conditioned by specific unique circumstances that the force of the common cause, if any, is lost. Perhaps more complete data would reveal relationships that would support some cycle theories, but data examined in this chapter fail to do so. The study of cycles must be of a specific and detailed nature; otherwise, the empirical study of historical cycles will not make any contribution to the practical problem of forecasting the probable characteristics of cycles to come or to the problem of their control.

This chapter has been confined to gross measures of the magnitude of cycles, and, therefore, is itself subject to some of the shortcomings that its conclusions suggest are common to many empirical researches. Though the cycles measured herein are regional, the method of measurement employed may hide significant factors. Rates of change within phases may be important, and it is for this reason that chapter vi will provide a more detailed examination of some of the larger intraphase changes.

CHAPTER V

REGIONAL CYCLICAL PATTERNS, 1919–1929: INTRAPHASE MOVEMENTS

AT SEVERAL points in the foregoing analysis, the necessity arose for more detailed consideration of cyclical pattern. This need was demonstrated by the complex character of the movements experienced in the individual areas. There are numerous examples of significant detail completely hidden by measurements utilized heretofore. Detroit provides an almost continuous case in point; in that area, it is not at all unusual for extreme variations to occur within a single month, and for those sharp peaks and troughs, therefore, to exaggerate cyclical movements. Because this characteristic of Detroit's series is so common, it does not carry as important implications for the magnitude of cycles as do other peculiarities in other areas. Even superficial examination of charts 10 to 13 and of charts 15 to 22 reveals the unusual movements of the various series in Detroit, so care is likely to be exercised in the interpretation and use of measures of cycles in Detroit.

Another and perhaps more dangerous type of movement that percentage change figures conceal is exemplified by the behavior of Los Angeles and Cleveland in chart 16 (Department Store Sales in Six Industrial Areas, 1929–1939). Obviously, the percentage increase between 1933 and 1938 is greater in Cleveland than in Los Angeles (84 as opposed to 53 per cent). Even combined with analogous figures for the previous decrease, these figures fail to show that between late 1932 and early 1935 Los Angeles made little recovery; they also fail to show that Cleveland moved upward sharply from the trough and maintained a level of operations for 1933, 1934, and 1935 that was substantially above that of Los Angeles. Cleveland succeeded early in achieving a measure of recovery, but Los Angeles failed to do so until 1935 at the earliest. A somewhat similar, though less marked, example of this kind of shortcoming is to be seen on chart 15 (Bank Debits) in the divergent movement of Los Angeles and San Francisco following the 1933 trough. In this case, the percentage increase in Los Angeles exceeds that in San Francisco, though it could hardly be said that San Francisco was more depressed.

METHOD OF MEASUREMENT

In chapter i, and again early in chapter v, a method was described which provides a more descriptive indication of amplitude, one that is affected by all the monthly values rather than merely the peak and trough. This technique involves the treatment of the monthly data within a single

cycle as a frequency distribution and the application to the distributions of the usual measures of central tendency and dispersion. Thus, in any area a cycle with a relatively high mean and a low coefficient of variation represents one which is relatively mild and in which monthly fluctuations are comparatively small, thereby describing a favorable situation for the area. Put in another way, these measures indicate that, on the average, the monthly values are higher than elsewhere, that these values lie closer to their average, and hence the series is more stable.

Individuals, as employers, as laborers, and as consumers, are much concerned with the level of business at any isolated point in time, and even more with the change between two points that are widely separated; but often they are more concerned with the short-term movements which, cumulating steadily, contribute to the long-term changes. Hence, the average standing of the months throughout a cycle is of real significance. (Notice the high average level of bank debits in Los Angeles in the 1923–1929 cycle [chart 10] and of that area's department store sales between 1922 and 1939 [chart 11], or of the low average level of Cleveland's power sales in the 1929–1939 cycle [chart 17].)

Equally important is the manner in which the measures of activity, month by month, distribute themselves around their average level. A measure of their distribution is extremely useful in appraising the welfare of the individual as it is reflected by a given business series. Short period changes, in other words, may be as damaging to individuals as any particular economic position. If these changes are confined within narrow limits (in this application, if the standard deviation or coefficient of variation is small), little violence is done to plans. It may be possible to become accustomed to stable conditions, however poor, and even to become accustomed to steadily deteriorating conditions, but reasonable adjustment to erratic changes is nearly impossible. It is true that a likelihood of such movements will be accompanied by significant alterations in business policy, but such alterations are often reluctantly made and far from satisfactory. Most frequently, they involve nothing more than attempts to make changes in a given position more painless, even at the expense of less acceptable current conditions. This does not mean that the absolute level about which these erratic movements occur is of no concern. Rather, both the level and the gyrations about it must be weighed in passing judgment on whether or not a particular cyclical picture is favorable.

These measures ignore the time sequence of the values, a fact which obviously is of considerable relevance. The shortcomings arising from this deficiency are considerably reduced, however, by combining these with percentage change, as utilized in earlier sections. These measures

individually or in combination, do not provide a perfect substitute for the study of all the values as presented in the last chapter in graphic form and tabularly in appendix ii. They represent a means of summarizing a vast amount of detail and thereby assist in the interpretation of it.

Additional measures of the characteristics of the distributions might contribute to the evaluation of a given cycle. Monthly values of any series may be more numerous above their own average than below, for the latter may be sufficiently far below to compensate for their fewness. A small measure of dispersion about the average does not preclude the possibility that the values in a cycle exceed their mean far more frequently than they fall below it, nor does it preclude the opposite (values more frequently below than above). Conditions are more favorable to rational decisions if the values below the average are few, even though those few are far below, than if they are numerous, though not so far short of their average. Thus, a measure of skewness, of the numerical distribution of the items above and below their mean, might be useful in the description of cyclical change. This measure, however, also ignores time sequence. In addition to this shortcoming, tests of skewness of the distributions indicate that the differences are not large enough to justify use of the measure and that proper interpretation requires almost complete knowledge of the shape of the cycle. Therefore, it cannot be used as a substitute for the data; interpretation is based upon percentage change, the mean, and the measure of dispersion, with the remaining detail described by the data to be found in charts 10 to 13 and 15 to 22 and in appendix ii.

The use of these measures may seem to be elaborate, and to create problems of interpretation that are hardly more manageable than the original one, but some reflection will reveal that the mean and the deviation measurement bring together an enormous amount of detail that otherwise would be difficult, if not impossible, to handle. This entire procedure of treating the series as frequency distributions serves to bring forward one problem which, though existent heretofore, has not been met directly and explicitly. This problem is one of the significance of differences between the series; in this case, between the distributions. The question that must be asked is: Are or are not the differences owing to chance alone? Variance analysis provides a means by which, under certain specific conditions, the probability of chance differences between distributions may be estimated. But the conditions which must be met before this technique may be applied appear to make it inappropriate as a solution to the problem at hand. First, the distributions must be normal, but in the distributions of monthly values they very often are not normal. This skewness, however, does not present an insurmountable

obstacle, for methods are available by means of which the normality assumption may be avoided.[1] The second condition, that the items in the distribution are independent of one another, cannot be met however, nor can this requirement be avoided by special processing of the data.[2] A time series of business data consists of a series of interdependent values and, as in this study where cycle, trend, and seasonal movement are studied, an assumption of interdependence underlies the entire work. Unquestionably, probability calculations can be applied to economic series, but only when the series is regarded as a "*sequence* of random variables" and never when an assumption of randomness of individual values in a time series is essential.[3]

There is no practical solution to the problem of the significance of differences, and the case will have to rest here upon whether the differences are relatively large or small, and especially upon whether non-chance causes are identifiable. Wherever specific causes for a divergence are discovered, then it assumes significance, even though small, and enough instances that are significant on this basis establish a likelihood that some undiscovered causes act in other instances. Chance, therefore, would be relegated to a subordinate position as an explanation for differences between distributions.

Cycles in Bank Debits

As in other instances, the diversity of cyclical reaction, together with some incomplete series, restricts the number of comparisons in which all areas appear. Over the entire period (1919–1945), the four series—debits, store sales, power sales, and employment—provide only nine cycles in which either five or six areas can be compared. The first of these is in debits between the 1920 peak and the following peak of 1923 or 1924 in which only San Francisco is noncomparable. This postwar fluctuation, as pointed out earlier, has several characteristics in common with the later cycle following 1929 and differs greatly from the intervening ones throughout the 'twenties. By far the most important aspect of this early cycle is that it involved sharp price change and was directly associated with wartime and postwar monetary experience. Its tie to money and to prices insures its reflection in business activity throughout the nation. Chart 10 reveals that even though San Francisco does not have a comparable cycle during this period, since its terminal peak is very much

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[1] Cf. M. Friedman, "The Use of Ranks to Avoid the Assumption of Normality Implicit in the Analysis of Variance," *Journal of the American Statistical Association*, Vol. 32 (1937), pp. 675–701.

[2] In Burns and Mitchell, *Measuring Business Cycles*, p. 391 ff., use is made of this technique even though the independence requirement is not met.

[3] Cf. T. Haavelmo, "Statistical Testing of Business-Cycle Theories," *Review of Economic Statistics*, Vol. 25 (1943), p. 14.

delayed, it is not unaffected by the changes that occurred nationally. That area merely remained depressed through 1924, and did not respond to the stimulus to recovery from 1921 as did the other areas.

Of the five areas remaining, Cleveland, Pittsburgh, and Chicago seem logically to distinguish themselves from Detroit on the one hand and Los Angeles on the other. The former three areas display a conventional cycle moving from peaks of approximately the same height to terminal peaks that are somewhat lower, though still of near equal height, from twenty-six to thirty-three months later. Of the three, Cleveland and Pittsburgh are most alike. At this time, the Cleveland economy had not yet linked itself to automobiles, and resembled Pittsburgh much more than it does

TABLE 32

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED BANK DEBIT VALUES, 1920–1923 CYCLE

Area	Arithmetic mean	Coefficient of variation (per cent)
Los Angeles	103.6	14.2
Chicago	96.9	10.6
Detroit	124.0	21.5
Cleveland	100.8	16.4
Pittsburgh	95.8	15.0

SOURCE: Derived from data in appendix ii.

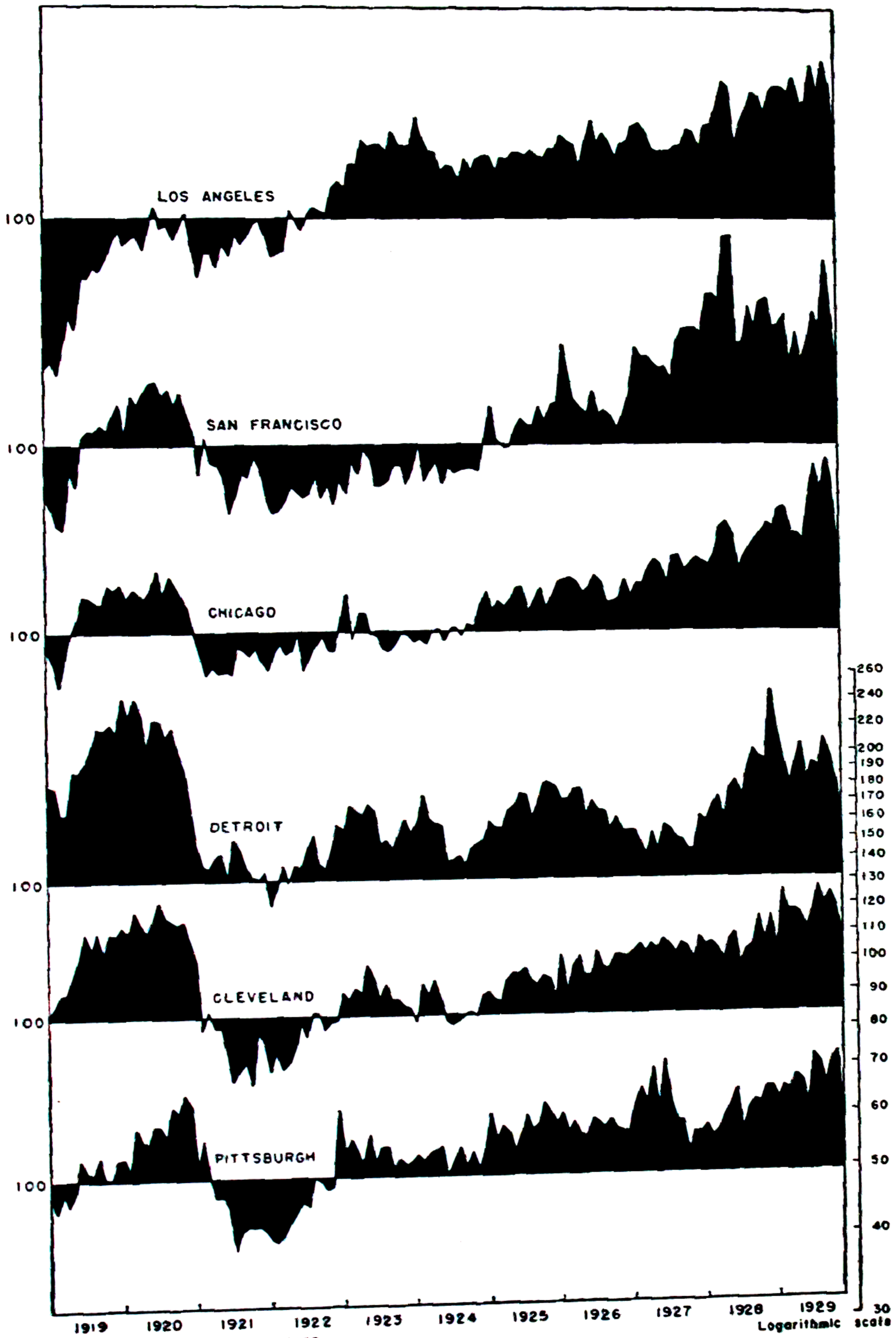
today. As late as 1929, 45 per cent of Cleveland's total manufacturing employment was in iron and steel (as compared with Pittsburgh's 60 per cent), and a vast majority of this was in basic production—steel mills and foundries. But, whereas over the years Pittsburgh remained essentially the same in its emphasis, Cleveland changed to lighter fabricated products. Manufacturing never was concentrated in Chicago to the same extent as in the other two cities, and Chicago was by no means as important a durable goods center. It leaned more heavily upon market-oriented activities such as trading, finance, and services. Chart 10 clearly shows a flatter trough in Chicago in this cycle, and somewhat less marked peaks.

Table 32 presents the measures discussed above for this debit cycle. These figures substantiate the impression created by the charted series. The means in Los Angeles, Chicago, Cleveland, and Pittsburgh are very close; especially alike is the depression in the last three. Detroit displays a marked cycle, but it is generally far above trend, and the average of the values is far above that elsewhere. The violence of the change in Detroit gives it the highest measure of variation.

CHART 10

Bank Debits in Six Industrial Areas, 1919 - 1929

Ratio of Index to 1919 - 1945 Trend



Base of unadjusted index, 1935 - 1939

Another kind of movement occurred in Los Angeles which is not revealed by these measures. The early peak was low, barely above trend, and the later one very high, whereas the other areas failed to recover their 1920 levels. The values in Los Angeles tend to offset one another, giving to the area a mean and deviation comparable with the three other areas but not with Detroit. Of all the areas, Chicago stands out as most stable, and Detroit as least.

Another cycle in debits overlapping this first postwar movement extended from the trough of 1921 to the 1924 trough. Taking these phases and measuring the cycle from trough to trough improves Detroit's record very much. The improvement in Detroit was brought about by active

TABLE 33

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED BANK DEBIT VALUES, 1921–1924 CYCLE

Area	Arithmetic mean	Coefficient of variation (per cent)
Los Angeles	107.9	14.6
Chicago	95.4	6.7
Detroit	114.0	8.8
Cleveland	99.7	10.1
Pittsburgh	102.8	8.9

SOURCE: Derived from data in appendix ii.

operations in the automobile industry. In the upswing from the 1921 trough, the automobile, railroad equipment, and construction industries showed distinctly rapid increases. The first activated Detroit, the last, Los Angeles, and all three created markets for the output of Pittsburgh and Cleveland; Chicago and San Francisco remained to share the consequences to a lesser degree. Chart 10 reveals this situation clearly. Again, San Francisco must be dropped from the comparison, and Chicago displays very little in the way of upswing and downswing between these successive troughs, though enough to make a cyclical movement observable. Table 33 provides measures analogous to those of table 32 which refer to this period.

Bank debits do not have other cycles where five or six areas are comparable until after 1929, but Los Angeles, Chicago, and Cleveland experienced a comparable cycle, measured from peak to peak, between 1923 (or 1924) and 1929. Detroit and Pittsburgh have extra cycles in that period and San Francisco reacts in a sufficiently peculiar way so that exclusion of all three is justified. The high level of activity that popularly

is attributed to the latter half of the 1920 decade clearly seems to have come to Los Angeles much earlier than elsewhere. Chart 10 shows that debits in this area moved upward to an adjusted index value of more than 140 by the spring of 1924, a time somewhat later than that when Chicago reached its trough, but preceding Cleveland's trough by approximately a half year. Indeed, it was not until early 1926 that the latter areas rose above 130, whereas Los Angeles, having achieved this level as early as the spring of 1923, remained far above the other two areas until the middle of 1927. The trough of 1923 or 1924 involved values close to 120 in Los Angeles and values slightly below 100 in Cleveland and Chicago. Thus, though this cycle did reflect itself in Los Angeles, it was about an extraordinarily high level.

The means of the values between these peaks were 132.0, 117.1, and 117.9 in Los Angeles, Chicago, and Cleveland, respectively, illustrating the comparatively early and great prosperity in Los Angeles. In this cycle, however, Chicago does not display relative stability, for the coefficients of variation are, in the same order, 10.5, 14.1, and 10.3. Inspection of chart 10 reveals that this instability in Chicago is largely a consequence of fairly violent movement in the last two years, 1928 and 1929. Before that time, debits in this area could hardly be said to fluctuate more than in Cleveland. The cause for the western area's unique movement (the rapid growth of population and unusual activity in construction) needs no further elaboration here, but the later, more violent, movements of Chicago and Los Angeles, as compared with Cleveland, are sufficiently unusual to justify further comment. It is helpful in this connection to refer to San Francisco's extremely violent movement in the middle of 1928 (chart 10) and to note there Chicago's and Los Angeles' similar, but less marked, fluctuation. In chapter iii, pages 94–95, the cause for San Francisco's extreme movement was set forth; for the same reason Los Angeles and, to a lesser extent, Chicago experienced sharp upward and downward movements at that time. This activity in the financial markets initiated the period of intense speculation culminating in the 1929 collapse.

The other comparison that may be made during this period, between Detroit and Pittsburgh from the 1924 to the 1927 trough, also presents some interesting contrasts, as chart 10 will show, even though the means, the variation, and the skewness of the values are very similar. This cycle in Detroit appears to be symmetrical, but in Pittsburgh it reaches its highest point very near the 1927 trough. Put in another way, the downswing is much more abrupt in Pittsburgh. This is an example of belated, though somewhat more severe, repercussions on the Pittsburgh economy of the Ford shutdown, the weaknesses especially of durable goods manu-

facture in general, and the weaknesses of construction and railroads in particular.

Summarizing the conclusion that may be drawn from this material dealing with debits in the areas during the 'twenties, it seems clear that in the period when price movements were important elements of cyclical change, Los Angeles and Detroit experienced relatively violent movements. On the contrary, when price change is not associated with cyclical movement, Los Angeles and, to a lesser extent, Detroit, appear to show no differential instability. In the early part of this period, Chicago showed a marked degree of stability, though later, when security speculation became intense, it fluctuated widely enough to hide the basic and underlying stability of the area. Throughout this decade, San Francisco was unusual, differing in most respects from the other areas. With less favorable long-term growth than Los Angeles, nonetheless it maintained a dominant position in financial matters on the Coast. A knowledge of this factor provides the key to the unique pattern of its cycles at this time.

Cycles in Department Store Sales

Department store sales provide no instances before 1929 where more than three areas are comparable, and in most instances only two can be compared legitimately. Only in Cleveland and Pittsburgh does a definable 1920–1923 cycle appear. Thereafter, no cycle of less than seven years' duration was revealed. The stability that such a situation represents as compared with that displayed by the bank debits, generally speaking, is a consequence of the resistance by consumers to fluctuating standards of living. Chart 11 clearly shows the impact of this resistance when contrasted with chart 10. Even in Cleveland and Pittsburgh, between 1921 and 1923, when store sales yield a complete and well-defined cycle, the sales cycle is much less violent than that in debits. Comparison of the measures of the debit and sales distributions in this cycle in these areas, provides the following data.

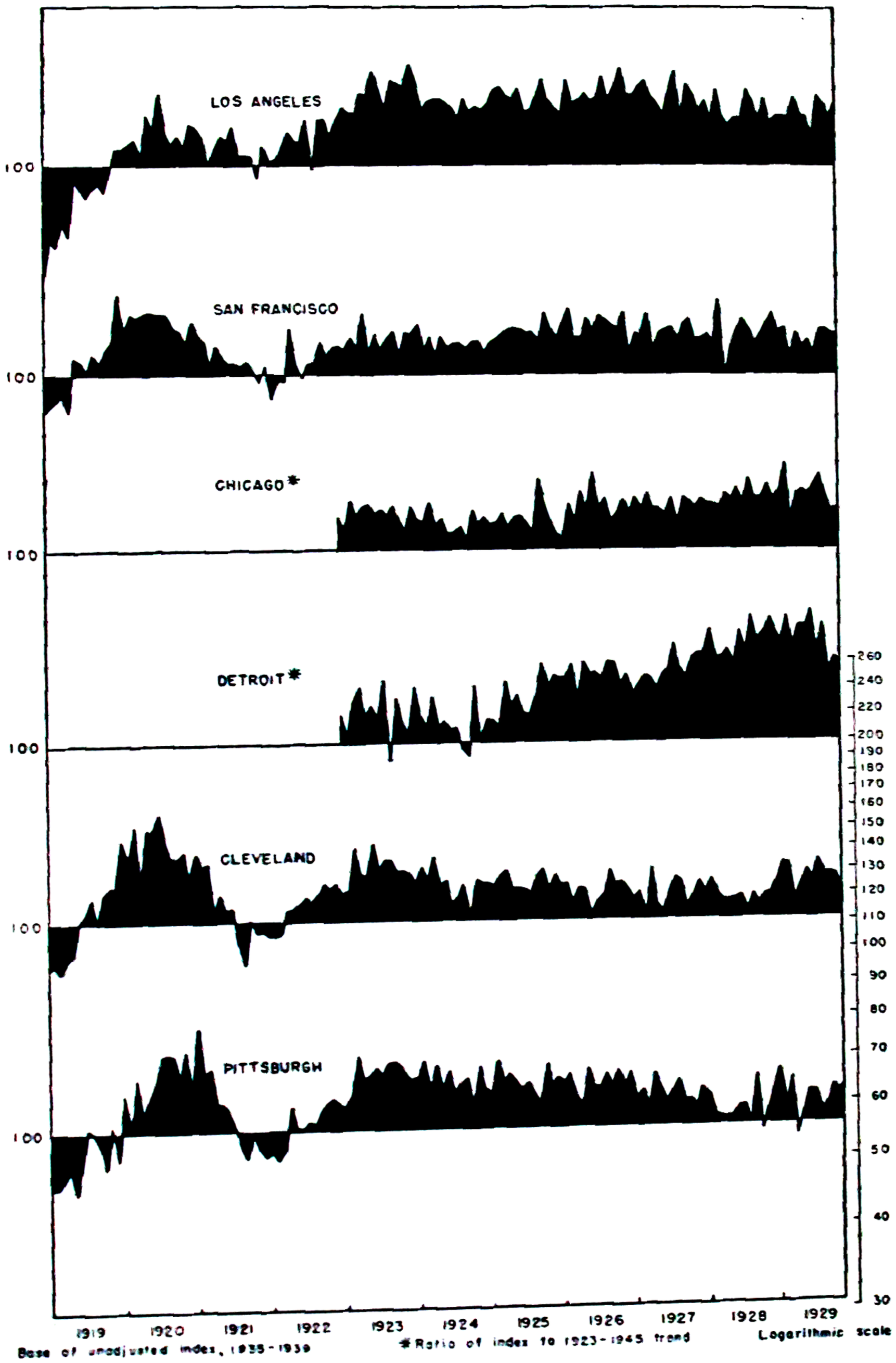
Area	Arithmetic mean		Coefficient of variation (per cent)	
	Debits	Sales	Debits	Sales
Cleveland	100.8	111.5	16.4	11.8
Pittsburgh	95.8	107.3	15.0	9.4

Elsewhere, the movements up from the 1921 trough led to plateaus of stable prosperity lasting into 1929 or 1930 rather than to peaks in

CHART 11

Department Store Sales in Six Industrial Areas, 1919-1929

Ratio of Index to 1919-1945 Trend



Base of unadjusted index, 1935-1939

*Ratio of index to 1923-1945 trend

1923 or 1924, as in debits.[4] Both western areas were stable during this period and in the trough-to-trough cycle between 1921 and 1928, Cleveland and Pittsburgh also displayed a high degree of stability. In this case, the means were somewhat below those for Los Angeles and San Francisco. Their variation coefficients were: Los Angeles, 8.0 per cent; San Francisco, 6.2 per cent; Cleveland, 6.8 per cent; and Pittsburgh, 6.5 per cent. Obviously, during the decade of the 'twenties, department store sales fail to support the differential fluctuation shown by the debit series. No area appears more or less stable than any other.

Cycles in Power Sales and Employment

Consideration of the power sales series in this decade is complicated by the fact that the data do not have uniform starting points. Only the series for Detroit, Chicago, and San Francisco are meaningful for a major part of the period. In fact, only one cycle belonging exclusively to this period can be identified in power sales from the 1921 trough to the 1924 trough in the three areas for which data are available. Of these areas Detroit is least stable; both San Francisco and Chicago have coefficients of variation far below Detroit's (4.5 and 5.0 per cent as opposed to 14.4 per cent in Detroit). San Francisco's stability is very likely because its series includes residential sales, which is certain to affect the magnitude of variation, though not so certainly affecting the timing and duration. Detroit, unlike Chicago, displayed a power cycle of more violence than its contemporaneous debit cycle, owing largely to the wide output change in Detroit and the comparatively stable price of the principal product, automobiles. Chicago's products experienced wider price change and smaller output change, causing the value series (debits) to move more violently than real series (power sales).

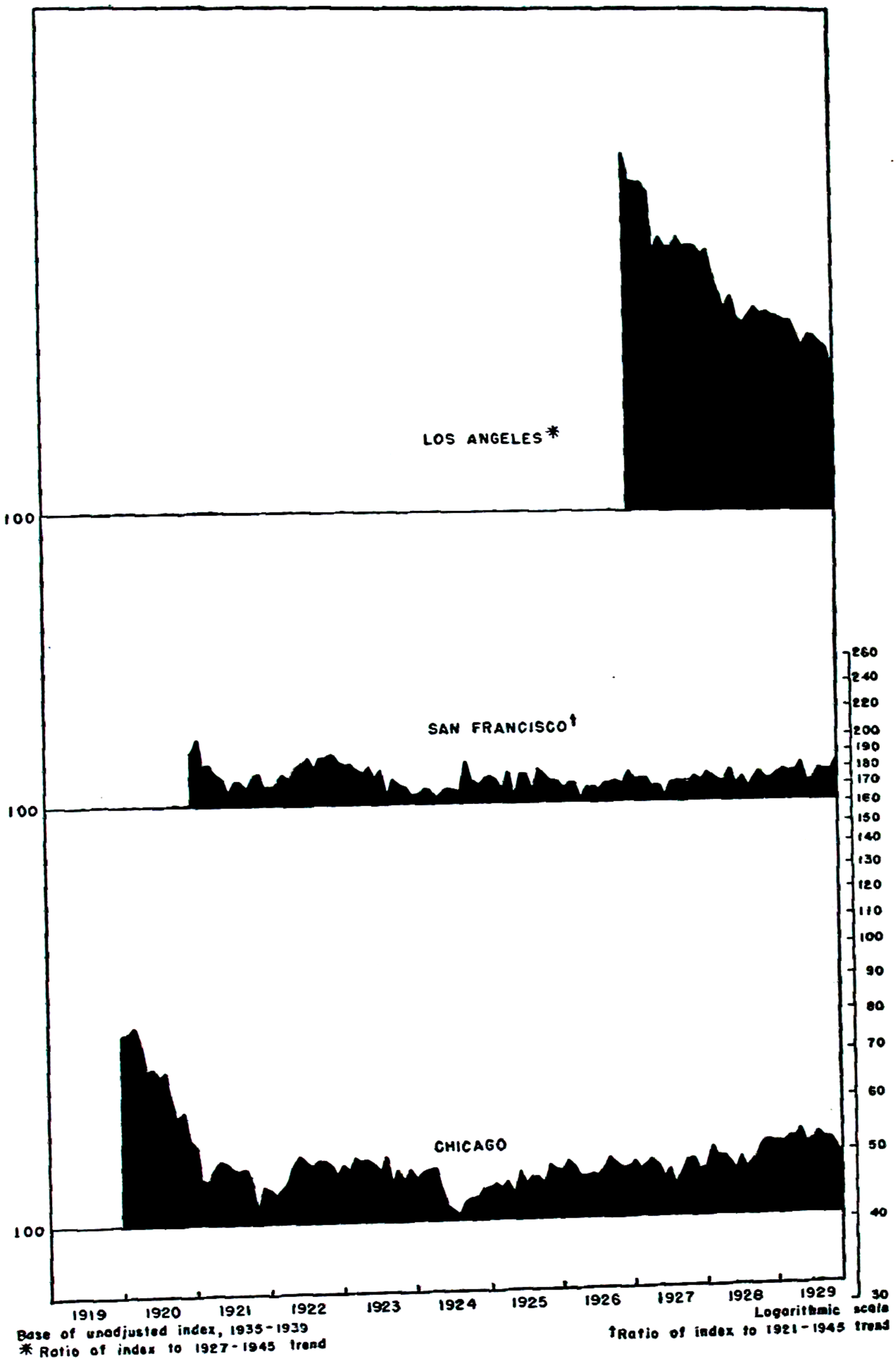
Cursory examination of chart 13, employment, gives the impression of unusual similarity to power sales in certain areas (chart 12). This is not surprising since both reflect physical output. As with power sales, the shortcomings of the data are unfortunate, but in the employment series more comparisons are possible. Detroit and Cleveland have trough cycles between 1921 and 1924, and all four eastern areas experienced complete cycles between 1923 and 1925 or 1926, again between 1924 and 1927 or 1928, and finally between 1925 or 1926 and 1928 or 1929. In the earliest cycle, in which Detroit and Cleveland alone are comparable, Detroit experienced a much more violent cycle; in addition to the fact that on the average its standing was considerably lower and its position, therefore,

[4] Data in Chicago and Detroit are unavailable before 1923. The characteristics of the series thereafter suggest that perhaps Detroit might have moved in a way similar to Cleveland and Pittsburgh were data available for the early years (chart 11). Chicago, however, resembles more Los Angeles and San Francisco.

CHART 12

Power Sales in Six Industrial Areas, 1920-1929

Ratio of Index to 1920-1945 Trend



Base of unadjusted index, 1935-1939

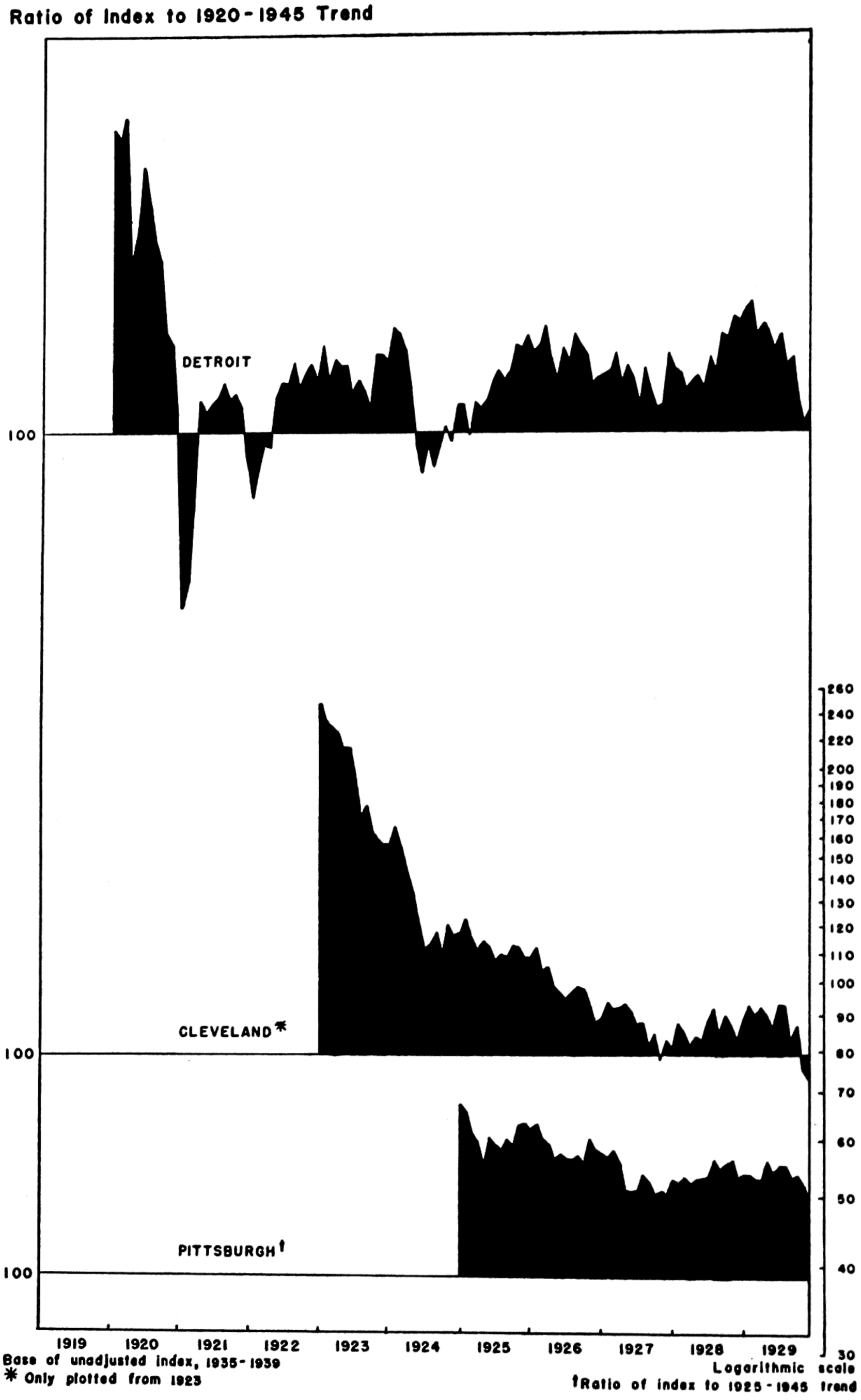
* Ratio of index to 1927-1945 trend

† Ratio of index to 1921-1945 trend

CHART 12 - CONTINUED

Power Sales in Six Industrial Areas, 1920-1929

Ratio of Index to 1920-1945 Trend



Base of unadjusted index, 1935-1939

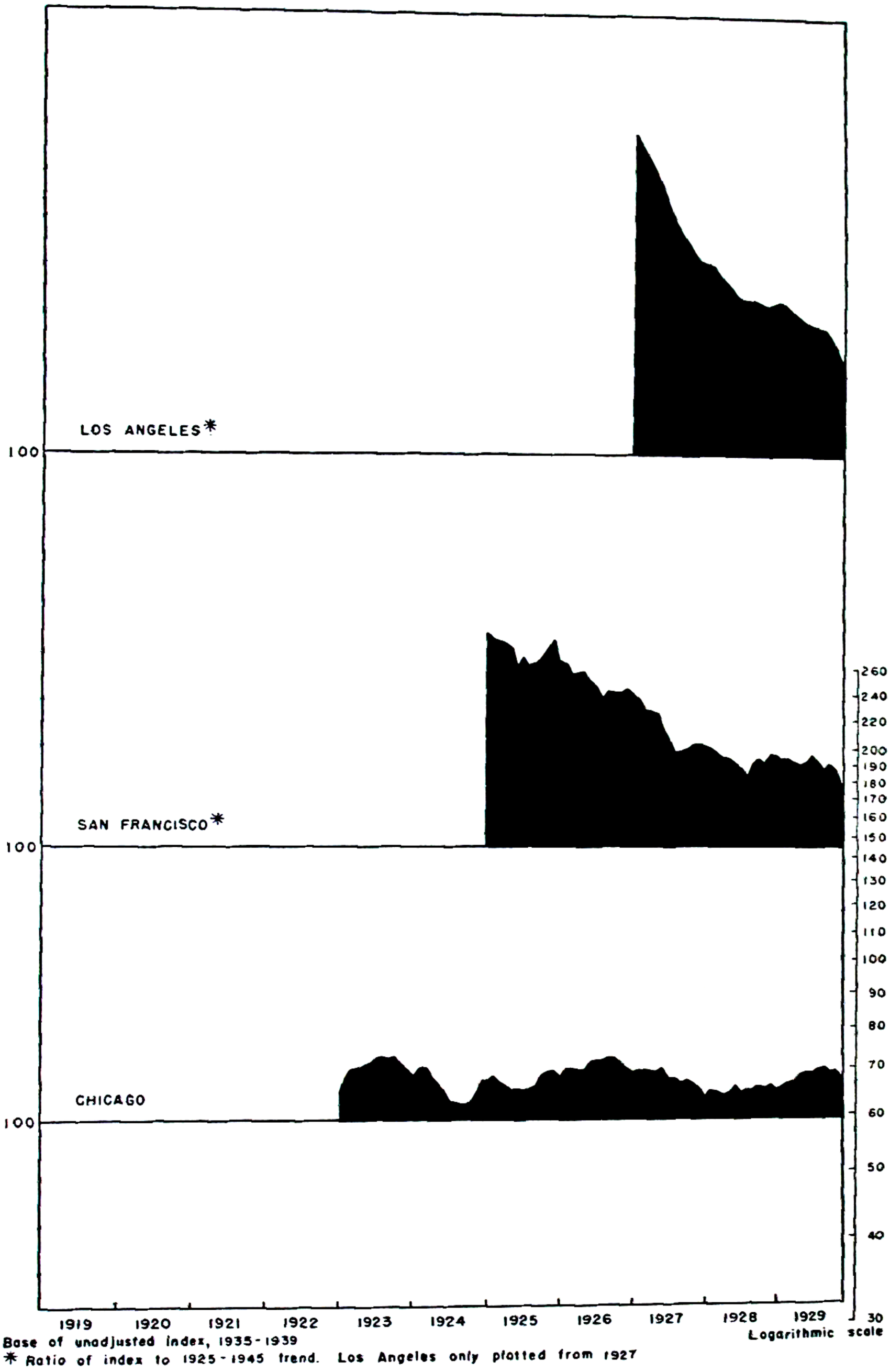
* Only plotted from 1923

†Ratio of index to 1925-1945 trend

CHART 13

Industrial Employment in Six Industrial Areas, 1920-1929

Ratio of Index to 1923-1945 Trend



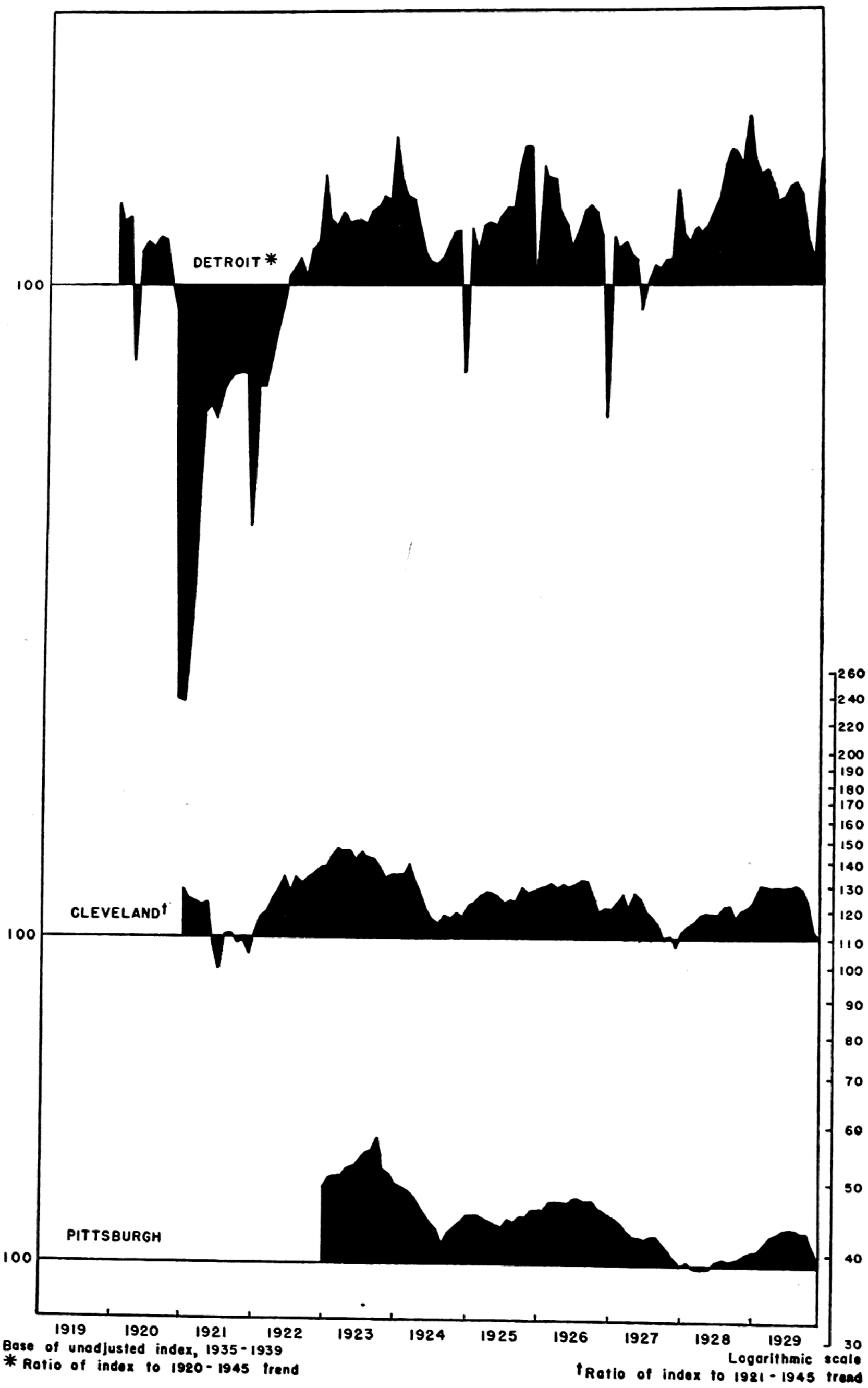
Base of unadjusted index, 1935-1939

* Ratio of index to 1925-1945 trend. Los Angeles only plotted from 1927

CHART 13 - CONTINUED

Industrial Employment in Six Industrial Areas, 1920-1929

Ratio of Index to 1923-1945 Trend



Base of unadjusted index, 1935-1939

* Ratio of index to 1920-1945 trend

Logarithmic scale

† Ratio of index to 1921-1945 trend

less favorable, its variation was roughly three times that of Cleveland (variation coefficient 32.4 per cent as compared with 10.2 per cent). It is, of course, true that a part of Detroit's variation is a consequence of violent one-month movements such as those of December, 1921, 1923, 1924, and 1926, which are a result of retooling operations and abnormal sales preceding or following automobile shows. However, their inconsistent timing over the years prohibits their treatment as seasonal variation,

TABLE 34

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED INDUSTRIAL EMPLOYMENT VALUES IN THREE CYCLES, 1923–1929 PERIOD

	Duration	Arithmetic mean	Coefficient of variation (per cent)
1923–1926			
Chicago	36	114.7	4.8
Detroit	21	120.2	12.5
Cleveland	40	117.5	6.6
Pittsburgh	35	120.1	7.3
1924–1928			
Chicago	43	114.5	4.6
Detroit	36	119.4	15.6
Cleveland	39	112.7	5.1
Pittsburgh	43	113.6	6.8
1925–1929			
Chicago	36	113.1	4.6
Detroit	36	120.8	15.6
Cleveland	36	110.8	6.1
Pittsburgh	35	107.6	7.5

SOURCE: Derived from data in appendix ii.

and requires that they be considered as episodic or erratic changes. Thus, they cannot be looked upon purely as distortions but must be seen as disturbing, but somewhat foreseeable, phenomena and, hence, more as cyclical elements. Their inclusion probably leads to an exaggeration of Detroit's instability, but exclusion would exaggerate that area's stability even more.

Table 34 provides the measures of the distributions of the values in the comparable areas for the three remaining cycles of the 1920's. These values show clearly that Chicago experienced markedly less cyclical movement than the other areas, Detroit more, and Cleveland and Pittsburgh an amount between these extremes. Cleveland, if anything, was slightly more stable than Pittsburgh. A high average value in Detroit,

which tends to lessen the onus of instability to some degree, is combined with relatively great variation. Again, the short-term movements in Detroit highlight and exaggerate the cyclical swings; but to the extent that major operators can foresee them, they cannot properly be considered elements of a cycle. Even if these changes are discounted, however, that area unmistakably has more unstable economic conditions than the other eastern areas.

Chicago's stability over these years primarily reflects its broad economic base; it seldom experienced the sharp movements of not only Detroit, but Cleveland and Pittsburgh as well. Its dependence on the production and sale of goods that are sensitive to income change and that fluctuate violently with changes in consumer income is limited. In addition to the fact that the other three areas concentrate on producers' goods and services, their few important consumers' goods items are of an income-sensitive nature. Examples of this latter class of goods are automobiles in Detroit and cooking and heating equipment and tools in Cleveland. On the contrary, printing, one of Chicago's large consumer items, is insensitive.[5] The only times when Chicago's rate of change exceeded those of Cleveland and Pittsburgh (the autumn of 1924 and of 1925) favorable circumstances in agricultural prices and in foreign markets provided the necessary stimulus.

The Four Series as Cyclical Measures

Some significant facts reveal themselves from a comparison of the relative magnitude of the cycles in each area as measured by the several series. Detroit provides a larger number of comparisons and, hence, will be treated first. In Detroit, employment is by far the least stable of the series. Even discounting those short erratic movements in Detroit, charts 12 and 13 show a measurably greater movement of employment than power sales, a fact of possible comfort to the utilities but hardly one to workers. In one cycle, from 1921 to 1924, the variation coefficient was precisely twice as great in employment as in power sales and three times that for debits (chart 10). In the 1924–1927 cycle, the movement of employment was two and one-half times debits. Although the data for store sales in Detroit are not complete enough to yield comparable cycles, those which are available indicate a great stability in that series as compared with others. The ranking of the several measures in order of stability of cyclical movement in Detroit shows store sales to be most stable, followed by debits, power sales, and employment decidedly least of all.

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[5] An excellent statistical study of consumer expenditures and income elasticity is that of L. J. Paradiso, "Classification of Consumer Expenditures by Income-Elasticity," *Survey of Current Business*, January, 1945, pp. 7–10.

Chicago's power sales and employment bear an opposite relationship to each other, for the power sales data fluctuate somewhat more than employment. Apparently, the most unstable series in Chicago is bank debits, and this is due to the 1927–1929 financial activity. In general, all of this area's series are much alike in this period, more so than any other area and, at the same time, significantly more stable.

Despite Cleveland's industrial characteristics and its functional relationships to Detroit, its series resemble those of Chicago more than those of Detroit in their relative movements. In the 1925–1929 cycle, the variation coefficient for debits was 10.3 as compared with 6.1 in employment, and in the 1921–1924 cycle these measures were nearly the same. Also, department store sales are generally most stable, as they are in Chicago, but month-to-month variations are often large.

No comparisons can be made between cycles in employment and in the other series in Pittsburgh, because the power sales and employment series are too short. A study of the relevant charts, however, suggests that Pittsburgh lies somewhat between Chicago and Cleveland on the one hand and Detroit on the other. Except in the last two years of the decade, employment demonstrated more instability than the other series and resembled Detroit in that respect; in the closing years of the decade, however, debits showed more variation as in Chicago and Cleveland.

Overlapping Fluctuations, 1923–1933

Although in this chapter emphasis is placed upon pre-1929 cycles, there are some which overlap. For purposes of completeness, they will be considered at this point. These are trough-to-trough cycles that extend from the low point preceding 1929 into 1933. Bank debits provide two sets of such cycles—Los Angeles, Chicago, and Cleveland from 1923–1924 to 1933 and Detroit and Pittsburgh, from 1927 to 1933. Of the first group, Los Angeles, with a somewhat lower mean than the other two areas, has a much lower variation. This is not a result of more over-all stability, but of the unusually stable high level of activity in that area from the boom of 1923 on through the remaining years of the decade. In Los Angeles, the movement upward from the trough of 1924 was much less pronounced than in Cleveland and especially Chicago. The downswing from 1929, however, proceeded at approximately the same pace in all three areas. Between Detroit and Pittsburgh, which display a 1927–1933 cycle, the former shows decidedly more variation as usual.

In department store sales, only Cleveland and Pittsburgh experienced comparable overlapping cycles between 1928 and 1933. In this case, both displayed almost identical patterns; neither the means nor the coefficients of variation differed by more than 1.0. However, when debits

and store sales are compared in Pittsburgh, the latter again show much greater stability.

Overlapping cycles in power sales and employment provide some further evidence on one significant matter. Detroit, Cleveland, and Pittsburgh all experience a 1927–1933 cycle in both series and, whereas power sales are more unstable in Cleveland and Pittsburgh, employment is measurably more unstable in Detroit. The coefficients of variation are shown in the table.

Series	Detroit	Pittsburgh	Cleveland
Employment	36.5	19.4	23.2
Power sales	30.7	28.4	27.3

These data support earlier conclusions of unusual employment instability in Detroit, a function of the nature of the industry involved. It would appear, however, that the extent of the differential variation in Detroit was declining as the automobile industry matured.

Period of Stability, 1919–1929

Before passing to the later period, there is some point in considering the entire decade of the 'twenties without reference to the cycles included therein; stability over periods may be important to businessmen, especially when identifiable cycles are small and when they involve movement around relatively high levels. Also, since the choice of comparable cycles is somewhat arbitrary, and since some areas, notably San Francisco, offer few comparisons, the treatment of all the values in the series within the period may throw additional light on the matter of differential stability. These comparisons, however, do represent a departure from the policy followed heretofore, that of comparing cycles only.

The method for dealing with these data is essentially the same as that already described. One difference is that the trends by which the series were adjusted refer to the period alone, and not to the entire 1919–1945 span. Thus, the means are nearly identical (100.0), and the standard deviation is a sufficient measure of the dispersion of the values about the trend.

Table 35 presents the standard deviations of the four series in each area. Immediately apparent is the instability of San Francisco's debits and Detroit's employment, both when each area is compared with others and when the series in these two are compared. The picture presented by these data lends support to earlier conclusions. In general, store sales are the most stable of the series, and there is least difference in the stability

of sales between the areas. Peculiarly, in Detroit, where employment is exceedingly unstable, store sales display great stability. Differential variation between the areas is greatest in the employment series, with Detroit in far the poorest position; there is little difference between Los Angeles, San Francisco, Chicago, Cleveland, and Pittsburgh. More frequently, in this period, employment values are above their trend, whereas in debits the reverse is true. Thus, in debits, though movement above trend was somewhat rare, when it did occur, it was violent. These data also demonstrate that, although San Francisco's position as a regional financial center made its debits unstable, its other activities,

TABLE 35

THE STANDARD DEVIATION OF ADJUSTED INDEX VALUES, FOUR SERIES IN SIX AREAS, 1919–1929

Area	Bank debits	Department store sales	Industrial and commercial power sales	Industrial employment
Los Angeles	8.3	8.6	12.1[a]	4.9[a]
San Francisco	18.2	7.5	5.3	5.3[a]
Chicago	13.0	5.7	9.5	5.0
Detroit	16.5	7.1	28.8	22.8
Cleveland	14.4	9.6	18.6	8.2
Pittsburgh	11.0	9.9	3.8[a]	6.1

SOURCE: Derived from data in appendix ii. Data are adjusted for trend to 1929 only.
[a] Not comparable because of short series.

affecting store sales, power sales, and employment were not destabilized thereby. Finally, Chicago's record appears to justify earlier comments to the effect that its economy is relatively stable, at least as compared with the other areas.

CONCLUSIONS

In a very real sense, 1929 marked the end of an era. The prosperous 'twenties were a period when new industries and war-created shortages, both at home and abroad, carried the American economy along with comparatively minor interruptions and adjustments. Even in these times of easy adjustment to small alterations in business conditions, each area studied has its own characteristics and peculiar reactions. Summarization of the comparative magnitude of cycles in the areas during this period is difficult, for valid generalizations that can be made are few in number. Nonetheless, these few are worth-while.

First, the vigor and the dominance of the automobile industry in Detroit gave decided instability to that area. This instability was greatest in employment, a feature that was characteristic only of Detroit, for

elsewhere the nature of the financial activities tended to make bank debits least stable.

Second, during this decade, only Chicago demonstrated any differential stability. In many ways, Chicago's economy is closely linked to near-by areas. It offers, first, an enormous market for both consumers' and producers' goods; second, its services as a distributor of the products of more specialized areas; and third, financial and other services essential to the business life of other areas. It resembles neither old and mature industrial areas nor young and dynamic ones in all respects. Although its economic pattern is more like that of Los Angeles, its rate of growth is more like that of Cleveland or Pittsburgh. Perhaps this unusual combination of characteristics is the sole cause for its stability; Chicago's behavior in more recent years may justify or refute this conclusion.

Third, in spite of great differences between Pittsburgh, Cleveland, and Los Angeles in rates of growth, in economic pattern, in resource base, and in markets served, these areas showed great similarity in cyclical reaction. Any advantage displayed by Los Angeles certainly seems to be associated with the fluid character of its population, and not to its emphasis of nondurable goods manufacture nor to its nonmanufacturing activities.

Fourth, financial activities of a most extreme character seem to affect Chicago and San Francisco most and Detroit very little. In every case, the results of speculative activity seem to be confined largely to the debit series. San Francisco, as the financial center of the West Coast at that time, experienced its own unique debit fluctuations. Capital markets apparently are not so broad as the phrase "mobility of capital" might suggest.

Finally, there is indication that the control of industry of a monopolistic type may contribute to employment and output fluctuation that is more severe than that occurring where more competitive conditions exist as a consequence of smaller units. Also, in spite of fewness of observations and insufficient data, it is tempting to suggest that, under these circumstances, other things remaining equal, output adjustments are more often made through the use of more or less labor than when smaller, more competitive, units predominate.

Chapter VI

REGIONAL CYCLICAL PATTERNS, 1929–1939: INTRAPHASE MOVEMENTS

The movement in business activity following 1929 has been likened to various earlier cycles, particularly that beginning in 1920. Others hold the position that this cycle was unique, that its major characteristics represented a response to basic underlying trends in the economies of the world, and especially of the United States, which culminated in the late 'twenties. Both views in all probability contain significant elements of validity. It is very doubtful if differences between this cycle and others are confined to differences of degree alone, but it is even more doubtful if it is unique in all important respects. Whatever the merits of either position, the essential problem of this work is to distinguish between the behavior of the separate areas. Thus, an examination of the characteristics of the fluctuations of the 'thirties against a background of the circumstances surrounding other cycles is somewhat out of order here; at the same time, since its major features very likely affect area behavior, some general examination of these features is certainly necessary.

Consequences of the 1929–1939 Cycles

A glance at any comprehensive collection of statistical materials will show both the magnitude and the inclusiveness of the 1929–1939 fluctuations. Almost all series related to business show some cyclical movement in this period, and many matters not so related also seem to have a cyclical pattern. Table 36 presents calculations of the per cent decline between 1929 and 1933 and of the increase between 1933 and 1937 in eighteen series. Several of these (e.g., marriages and divorces), on superficial consideration, would seem to be only indirectly related to economic conditions or to institutions the characteristics of which reflect business cycles. The pervasive nature of this business fluctuation and the devious routes by which its consequences make themselves felt undoubtedly deserve more attention than they have received.

There are, however, strong indications that these matters are receiving increasing attention; one excellent study of Dr. Dorothy S. Thomas, titled *Social Aspects of the Business Cycle*,[1] explores certain aspects for an earlier period and for generally milder cycles. Her conclusions are sufficiently interesting to justify repetition here. First, marriage rates in both England and the United States are positively correlated with business conditions. Second, divorce is also closely related to business in

[1] D. S. Thomas, *Social Aspects of the Business Cycle* (New York, 1924).

the United States, but not in England. Third, both birth rates and illegitimacy are related to business cycles, though in an opposite manner. Fourth, infant mortality, deaths from tuberculosis, and suicides show a decided tendency to increase in depression and decrease in prosperity. Fifth, alcoholism is positively related to business cycles; finally, crime seems to be somewhat sensitive to changed business conditions, though its specific relationship varies with the type of crime involved.[2]

TABLE 36

CYCLICAL CHANGE IN SELECTED SERIES, 1929–1937

Series	Per cent change 1929–1933	Per cent change 1933–1937
1. National income	−52	67
2. National income per capita	−37	38
3. Employment	−19	19
4. Unemployment	2,850	−46
5. Consumer outlay	−41	40
6. Individual saving	−76	219
7. Corporate saving (net)[a]	....	..
8. Capital formation[b]	....	..
9. Personal taxes	−40	72
10. Manufacturing output	−37	65
11. Mining output	−36	55
12. Agricultural output	− 3	9
13. New construction	−77	130
14. Wholesale prices	−31	31
15. Cost of living	−25	11
16. Marriages per 1,000 population	−24	29
17. Divorces per 1,000 population	−21	47
18. Birth rate per 1,000 population	−12	3

SOURCE: Derived from data in appendix v.

[a] Corporate saving negative from 1930 to 1937. Values (billions of dollars) in 1929, 1933, and 1937 were 1.2, −2.8, and −0.8, respectively.

[b] Capital formation negative in 1932, 1933, 1934. Values (trillions of dollars) in 1929, 1933, and 1937 were 10.0, −3.6, and 6.4, respectively.

Other investigations emphasize the consequences of this cycle to family structure or interfamily relationships, and even to the psychology of the individual.[3] For example, Sherif and Cantril make the following observation:

> From studies made on the psychological effects of unemployment, for example, it can be readily discerned that if an individual is not provided the opportunity or

[2] For example, arson apparently increases in depression, whereas crimes against morals increase in prosperity. Cf. H. A. Stone, "Fire Losses in the United States and Canada, 1926–1934," *Municipal Yearbook, 1935* (Chicago, 1935), p. 85.

[3] See, for example, S. A. Stouffer and P. F. Lazarsfeld, "Research Memorandum in the Depression," *Social Science Research Council Bulletin 29* (New York, 1937), and M. Sherif and H. Cantril, *The Psychology of Ego-Involvements* (New York, 1947), pp. 399–403.

right to work, the constellation of values constituting his ego may deteriorate radically, causing a shift in his aspiration levels and a breakdown of former group loyalties. We should emphasize that in this discussion we are not generalizing that these *are* the inevitable effects of unemployment and depression alone, but that unemployment and depression sometimes can and do cause these effects as well as others that do not concern us here. And obviously, how any single individual will react to unemployment will depend in part upon personality factors such as temperament and on the length and circumstances of unemployment.[4]

Consumers' Outlay and Capital Formation

Most important to this investigation, however, is the movement of the various business series and particularly of consumers' outlay and capital formation. Any business series may contribute to the ultimate explanation of the cycle or to the explanation for regional differences, but it is in the last two that causal forces come into focus. Of these two, capital formation is obviously the more flexible and for this reason alone might be assigned the strategic role, but the weight of a near consensus of cycle theorists with respect to its primary significance provides added justification for its earlier and more detailed investigation.

Capital formation is ". . . the flow of currently produced commodities and services into the stock of economic goods. Thus defined, the volume of capital formation is one of two parts of the total volume of currently produced commodities and services."[5] Therefore, it represents unconsumed current output, and, since consumption may exceed current output, capital formation may be negative as well as positive. The distinction commonly drawn between gross and net capital formation is based on the inclusion in the former of capital consumed in the productive process and its exclusion in the latter. Thus, net capital formation represents the destination of all goods unconsumed, or the destination of society's real saving.

Since 1919 real capital formation never exceeded 15 per cent of total national income, and generally reflects a changing relationship to it so that there is a "looseness of correlation" between them.[6] But if the totals of the two reflect a variable relationship, the components of capital formation do so to an even greater extent.

Historically, investment is a destabilizing determinant of income, and, even though in absolute amount it is relatively small, its consequences may be altogether disproportionate to its size. Moreover, some parts of total investment, notably residential construction and business inventories, experience much wider swings than total investment.[7] Indeed,

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[4] Sherif and Cantril, *op. cit.*, p. 399.
[5] S. Kuznets, *Commodity Flow and Capital Formation* (New York, 1938), Vol. I, p. 3.
[6] Kuznets, *National Income and Its Composition, 1919–1938*, Vol. I, pp. 268–271.
[7] In table 37, revised estimates for certain columns were available. These make the sum of the components of net capital formation deviate from the total. In most cases, however, these differences are small.

in the failure of residential construction to move upward sufficiently from the trough, Professor Hansen finds a substantial part of his explanation for the incomplete recovery.[8] What is more, the decreasing liquidation of business inventories is, according to the same author, largely responsible for the stimulus to recovery provided by business expansion.[9]

Data bearing on the possible differences in capital formation in the areas are fragmentary, but there is enough evidence to justify the observation that such differences do exist and are rather marked. For

TABLE 37

NET NATIONAL PRODUCT, NET CAPITAL FORMATION, AND NET CAPITAL FORMATION BY TYPE OF PRODUCT, 1929–1937
(Billions of dollars, 1929 prices)

Year	Net national product[a]	Net capital formation[a]	Capital formation by product				
			Producers' durable and business construction	Construction		Net change in inventories[b]	Change in foreign claims[b]
				Residential	Public		
1929....	86.9	10.5	4.3	1.1	1.8	2.4	0.4
1930....	79.9	4.2	2.6	−0.1	2.2	−1.1	0.7
1931....	68.7	0.2	−0.2	−1.0	2.2	−1.4	0.3
1932....	55.5	−5.7	−2.4	−1.6	1.6	−3.2	0.1
1933....	56.3	−5.2	−2.5	−1.8	0.8	−1.7	0.2
1934....	63.0	−4.2	−1.3	−2.0	1.4	−2.3	0.4
1935....	67.6	0.3	−0.4	−1.6	1.2	1.3	−0.2
1936....	77.8	4.3	1.4	−0.9	2.6	2.9	−0.4
1937....	84.0	5.0	2.6	−0.6	1.9	2.6	−0.1

SOURCE: Derived from S. Kuznets, *National Income and Its Composition, 1919–1938* (New York, 1941), tables 37 and 38.
[a] S. Kuznets, *National Product Since 1869* (New York, 1946), p. 56. Data used are "Peacetime Concept."
[b] S. Kuznets, *op. cit.*, p. 46.

example, building permits in sixteen cities and villages in Cuyahoga County (not synonomous with the Cleveland area, but probably fairly representative of it) declined 94 per cent between 1929 and 1933, and then increased 673 per cent to 1937. Comparable figures for southern California are 80 and 293 per cent. The significance of these differences in this one type of capital formation can hardly be questioned.

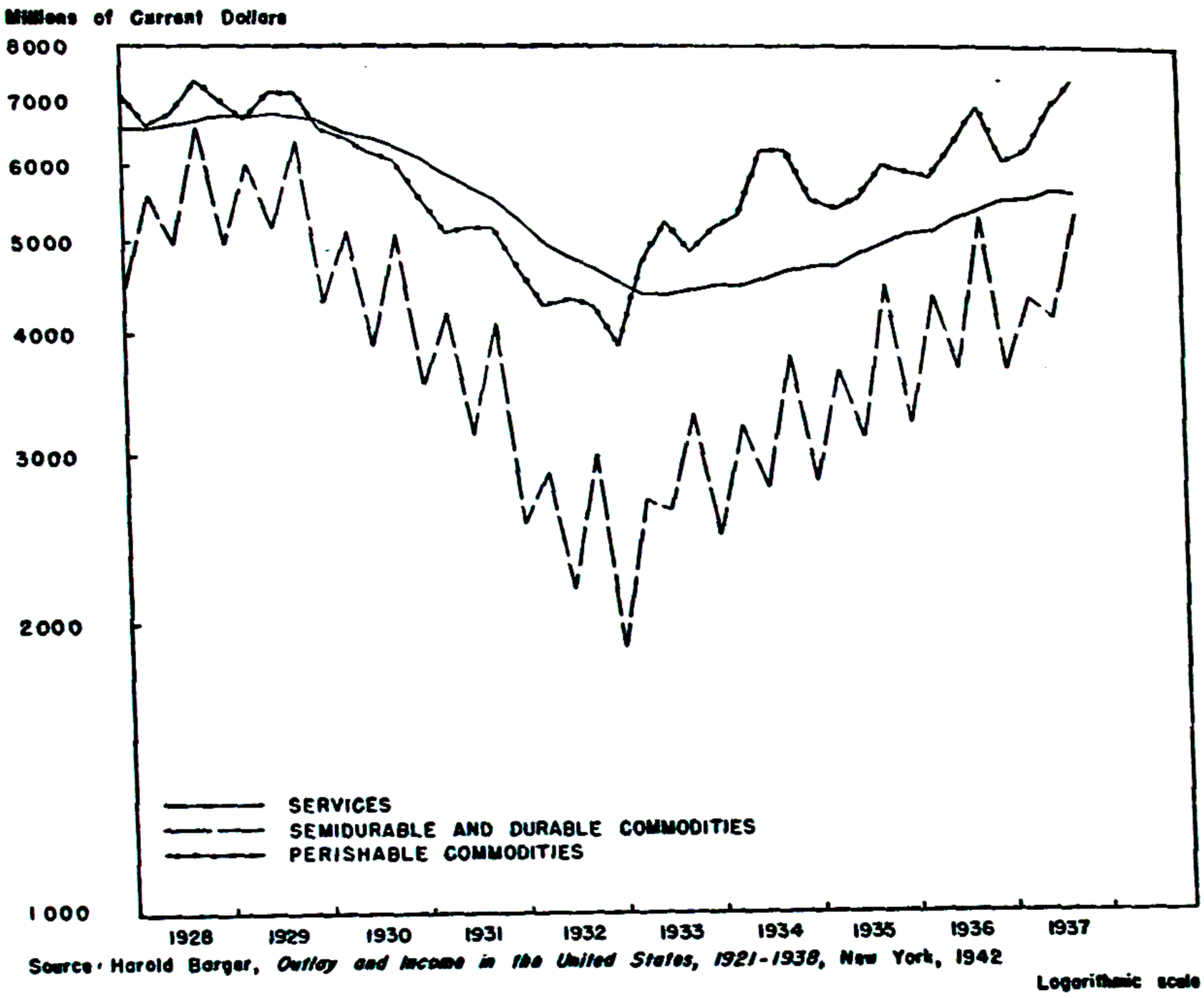
Probably more important than differences in the fluctuations of construction between areas are differences in investment in producers' durable goods and in business inventories. That these exist is certain, for the rates of general industrial growth governing such investment differ substantially between areas. Added to this is the fact that the size of

[8] Hansen, *Fiscal Policy and Business Cycles*, pp. 26–27.
[9] *Ibid.*, pp. 54–55.

establishments also varies from area to area. Further, because the large establishment absorbs proportionately more capital, a second reason arises for divergent rates of investment in producers' durable goods. Finally, the different industries themselves expand at different rates. In recent years, nondurable goods production increased relative to durable goods production. Therefore, nondurable goods centers would tend to

CHART 14

Consumers' Outlay by Class of Product, United States, 1928 - 1937



Source: Harold Barger, *Outlay and Income in the United States, 1921-1938*, New York, 1942

invest relatively more in producers' durable goods than would otherwise specialized areas. A striking illustration of this last point is the fact that investment in the food industries was more than double that in iron and steel in both 1929 and 1939, and investment in the latter was surpassed also by that in textiles and automobiles in both years. Thus, though specific and direct measures of regional differences in the fluctuations in investment in the producers' durable goods cannot be made, there is a certainty that they exist.

Less conclusive evidence is available on regional peculiarities in the rate of investment in business inventories. Inventory accumulation is a

function of so many variables that the force of any specific one as a basis for a given regional divergence would be difficult to assay. At the same time, there is some likelihood that large business units generally hold larger inventories than small, so that, in areas where large enterprises predominate, accretions to or decreases in inventory may be larger than elsewhere. Thus, since there is variation in the average size of business enterprise between the areas under consideration, there is some evidence that diverse amounts of investment in inventory will be characteristic.

As some economists contend, capital formation may be the variable in which the forces acting to bring about business fluctuations are brought together. But, additionally, this variable itself may vary to such an extent from area to area that its final consequences on the individual regions may be quite different.

Consumers' outlay is the second variable bringing together various forces and combining them into a proximate cause for business change. Consumers' outlay appears as a subordinate factor in most cycle analyses, although in some it is extremely significant. It may well provide some potent reasons for differential regional reactions, even though its significance as an initiating cause may be subject to some question.

There are two general reasons why consumers' outlay contributes to regional variance. First, since outlay for particular types of commodities and services changes at unequal rates, regions providing them in different proportions also react at unequal rates. For example, a tourist center should react closely with changes in outlay for the services demanded by tourists, whereas a dairy center, in like manner, should reflect changes in outlay for perishable goods, or more particularly, perishable food items. Chart 14 presents three series—consumers' outlay for services, for perishables, and for durable and semidurable commodities. The differences in the rates of change in outlay on these three classes of items are striking.[10] Differences in the relative importance of the services, and the production of nondurable and durable goods between the areas may make the unequal reaction of various types of consumers' outlay reflect itself in varying degrees of cyclical instability.

The second reason why consumers' outlay may account for regional cyclical differentials is also associated with specialization. If an area's exports are commodities and services which react violently to income change (have high-income elasticities), whereas its imports do not (therefore have low-income elasticities), that area's income will experience wider cyclical movement than will others with opposite type

[10] A finer breakdown of consumer outlay is available in W. H. Shaw, "Consumption Expenditures, 1929–43," *Survey of Current Business*, June, 1944, p. 7.

exports and imports.[11] Consequently, the specific nature of an area's external trade will condition its cyclical response. Because the trade of each area has its own characteristics, regional cyclical change is also likely to display some individuality.

To illustrate the part that outlay may play in affecting the response of one of the areas under consideration in this study, it is interesting to consider the percentage change in outlay on a few of the items important to the Los Angeles economy and to compare these with total outlay. To this area, petroleum, motion pictures, food, and tourist services are extremely important, for they are among its leading exports and constitute important sources of employment and output within the area. Total outlay declined 41 per cent between 1929 and 1933, outlay on motion pictures declined 33 per cent, and on transient hotels and tourist cabins, 49 per cent. In the same period, expenditure on food for off-premise consumption and purchased meals and beverages declined 40 per cent, almost precisely as much as total outlay.[12] Although outlay of tourists in southern California cannot be precisely determined, the best estimate available makes the decline to 1933 approximately 71 per cent.[13] Likewise, although outlay on the southern California citrus output and petroleum products cannot be established precisely, there was a 44 per cent decline in the total value of the former (calculated by multiplying the average price per box and total output),[14] and a 55 per cent decline in the latter (net exports of petroleum).[15]

These data suggest that consumers' outlay leads to differential cyclical responses regionally and analogous data for the 1933–1937 revival provides even stronger proof. Compared with a 40 per cent increase in consumers' outlay, outlay on purchased meals increased 94 per cent, on transient hotels 62 per cent, and on motion pictures 40 per cent. In southern California the estimate of tourist expenditure jumped 130 per cent, on citrus exports 40 per cent, and on net exports of petroleum products 44 per cent. In view of the varied response of these items to cyclical change, it is difficult to deny to consumers' outlay a significant role in the creation of regional cyclical differentials.

Bank Debits and Store Sales, 1929–1937

The 1929–1937 period provides a cycle in which many comparisons are possible, for the uniformity of turning points was marked. Therefore,

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[11] Cf. R. Vining, "Regional Variations in Cyclical Fluctuation Viewed as a Frequency Distribution," *Econometrica*, July, 1945, p. 193.

[12] Shaw, *op. cit.*, tables 1 and 3.

[13] All Year Club of Southern California, unpublished report.

[14] California Fruit Growers Exchange Marketing Research Department, *Statistical Information on the Lemon Industry*, and *Statistical Information on the Orange Industry*.

[15] Long Beach Harbor Department, Chief Accountant's Office and Board of Harbor Commissioners, *Annual Statistical Reports*, Los Angeles.

the two value series will be treated simultaneously, and the real series, employment and power sales, are taken together, even though power sales, because of extra cycles, provide the major exceptions to the general pattern of the period. Table 38 provides the arithmetic mean and coefficient of variation for each area for the debits and store sales series, and charts 15 and 16 provide the detail upon which the distribution summaries were prepared. These data tend to substantiate some of the observations made earlier on the basis of pre-1929 experience.

First, in those areas where financial markets are relatively significant,

TABLE 38

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED BANK DEBITS AND DEPARTMENT STORE SALES VALUES, 1929–1937 CYCLE

Area	Bank debits		Department store sales	
	Mean	Coefficient of variation (per cent)	Mean	Coefficient of variation (per cent)
Los Angeles	78.6	29.8	78.7	23.8
San Francisco	83.9	32.4	75.3	20.5
Chicago	81.9	33.6	85.9	18.9
Detroit	69.6	37.5	81.5	29.6
Cleveland	75.1	30.9	80.2	19.5
Pittsburgh	79.3	28.8	81.2	22.9

SOURCE: Derived from data in appendix ii.

the abnormally high peaks in 1929 (followed by troughs in 1933 that are as low as in most centers) make the debit series inordinately variable. San Francisco and Chicago share the most unstable positions, illustrating this fact. In Detroit which is even more unstable, concentration in an unstable industry is sufficiently pervasive to color all series, so the resultant instability is not unexpected. On the other hand, in San Francisco and Chicago, where the economies are more diversified, with well-developed nondurable consumers' goods segments, their instability in bank debits is more surprising. Chart 15 gives further evidence of the unusual sensitivity of San Francisco and Chicago to financial conditions by the rapid jump up from the trough following the sharp recovery of stock prices and the temporary, but great, increase in market activity. Perhaps, in the recovery of 1933–1937 there is to be found an added reason for this instability, for both areas moved up above their means fairly early and remained somewhat above for several months.

During the same period, the debit series are measurably more stable in Pittsburgh and Los Angeles, with Cleveland less so, but still in a favor-

CHART 15

Bank Debits in Six Industrial Areas, 1929-1939

Ratio of Index to 1919-1945 Trend

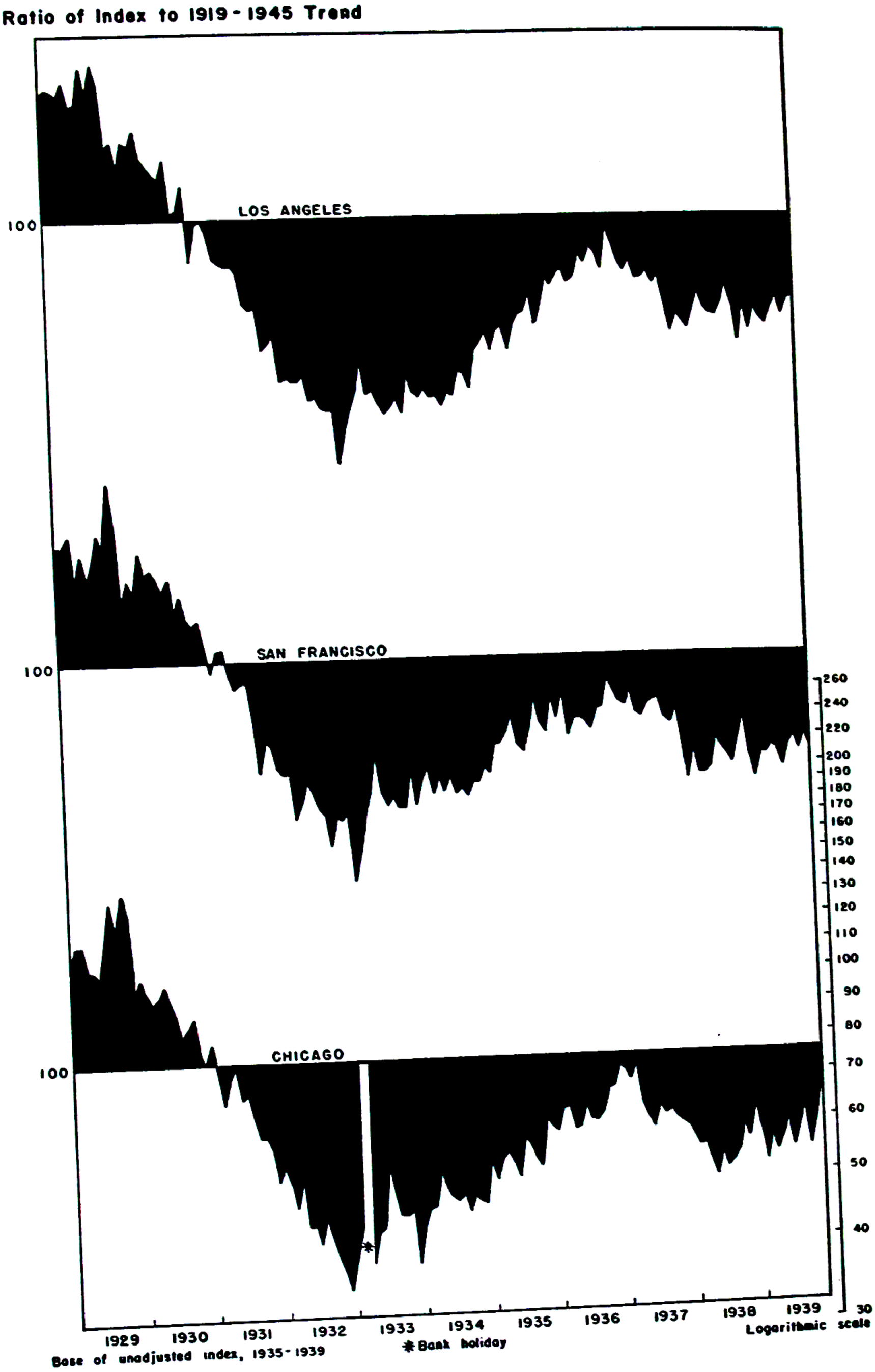
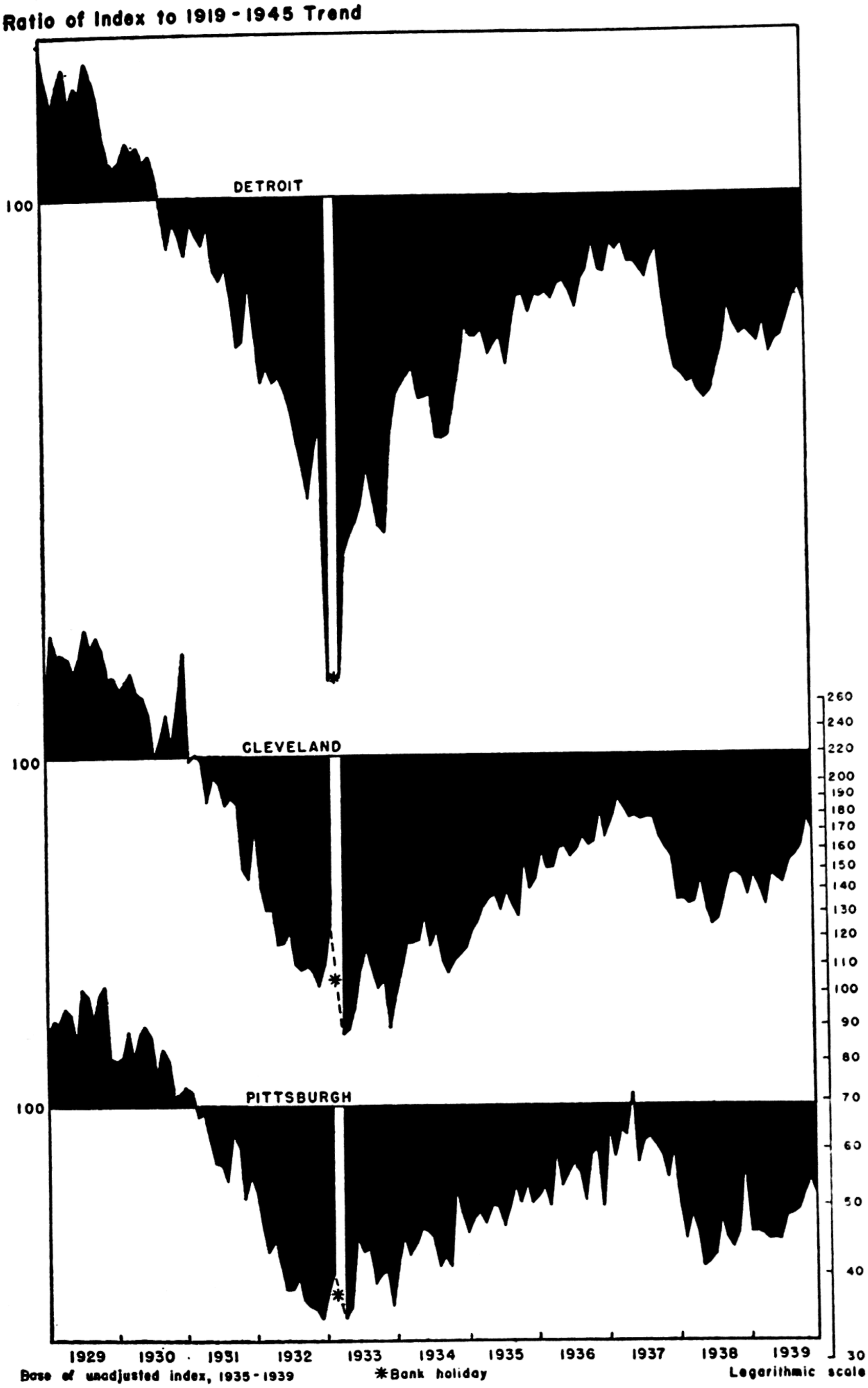


CHART 15 - CONTINUED

Bank Debits in Six Industrial Areas, 1929-1939

Ratio of Index to 1919-1945 Trend



Base of unadjusted index, 1935-1939 *Bank holiday Logarithmic scale

able position as compared with the three least stable areas. Certain important facts concerning these areas are related to their movement as reflected in debits (chart 15). First, though Cleveland's downswing is nearly parallel to that in other areas, the course of its recovery appears to be less smooth, particularly between the trough and the autumn of 1935. Thereafter, its recovery is slightly more rapid than elsewhere, but in those first years of recovery movement upward was periodically interrupted by substantial recessions. These subcycles are duplicated in Detroit, but are not so noticeable in the other areas.

Second, Los Angeles likewise moved downward at a rate substantially parallel to that of other areas, but, like Cleveland, it experienced a somewhat unusual upswing, for the latter years of the recovery reflected more rapid movement upward than the earlier years. From 1933 through 1934 very little recovery was made in Los Angeles, for if the two lowest months in early 1933 are discounted, the trough in that area was practically flat. This seems to be directly contrary to the thesis that the recovery was "mainly a consumption recovery,"[16] for Los Angeles, of all the areas, has a consumption economy.

Finally, although Pittsburgh is a producers' durable goods center, from chart 15 and table 38 it appears to be in a favorable position. Of all areas, its dispersion is least, and it is the only area which reached its trend in 1937.

These three areas, differentiating themselves from the others by their stability and reacting in unusual manners in the upswing, probably deserve more consideration than they have received; but such study should await the demonstration of peculiarities in other series, and it will be undertaken after store sales, employment, and power sales have been examined.

Department store sales in all areas appear to be much less variable than debits, for the variation coefficients range from 18.9 to 29.6 per cent as opposed to those for debits of 28.8 to 37.5 per cent. [In all areas this greater stability of sales appears, and quite naturally so.] As in the 'twenties, consumers resisted declining real planes of living. Even in the face of declining income and employment, strenuous efforts were made to maintain consumption standards. Also, the store sales means are higher than for debits in every case save San Francisco. This is more than likely a result of the nature of department store inventories, because these stores in San Francisco deal relatively more in luxuries than do those in the other centers.[17] The positions of the areas between 1929 and

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[16] Hansen, *Full Recovery or Stagnation*, p. 274.

[17] Further evidence on this may be derived from data in appendix iv. During the decade of the 'thirties, the seasonal index of department store sales for San Francisco

1937 with respect to stability vary considerably between debits and store sales, for the latter series shows Chicago, Cleveland, and San Francisco to be most stable, and Pittsburgh, Los Angeles, and Detroit to be least so. Thus, Chicago switches completely between debits and sales from instability to stability and finance again is responsible. Los Angeles and Pittsburgh, on the contrary, appear to become relatively unstable.

Though Chicago's about-face is readily understandable, the explanation for the change in the position of the other two areas is more difficult. Neither Los Angeles nor Pittsburgh is a financial center, which fact would tend to make their debit series more stable than otherwise would be true. Probably more important is the marked lag of Los Angeles' store sales in moving upward after the trough of 1933. The reappearance of the flat trough in the cycle for Los Angeles in this series confirms the first impression of its reaction from the debit series. Pittsburgh's rapid recovery is undoubtedly a consequence of its status as a durable producers' goods center.

Chart 16 shows a one-month collapse in Pittsburgh that justifies comment. This unusual movement in March, 1936 was due to a flood on St. Patrick's Day that was the worst in the history of the city. Almost all of the department stores there are in the downtown area, and they were closed for about two days to as long as two weeks. San Francisco's sharp dip in September, 1938 was caused by a strike of department store workers. Chicago likewise experienced some erratic movement in 1933 and 1934, reflecting somewhat higher levels of sales than might be anticipated. This was a response, no doubt, to the Chicago exposition, "A Century of Progress." These movements are obviously noncyclical in character.

Power Sales and Employment, 1929–1937

The power and employment series again fail to provide as many comparisons as do the others; although the series in Los Angeles and San Francisco do carry back into the middle 'twenties, they fail to exhibit an identifiable turning point before 1933. Pittsburgh, Cleveland, Chicago, and Los Angeles have minor cycles in 1933–1934 which make their power sales series different from employment, debits, and store sales; in the latter three series some similar movements appear, though they were too slight to identify as a cyclical change. However, in view of the interest in this cycle, and also the fact that other series show some suggestions of a minor cycle comparable with that of power sales, the distribution

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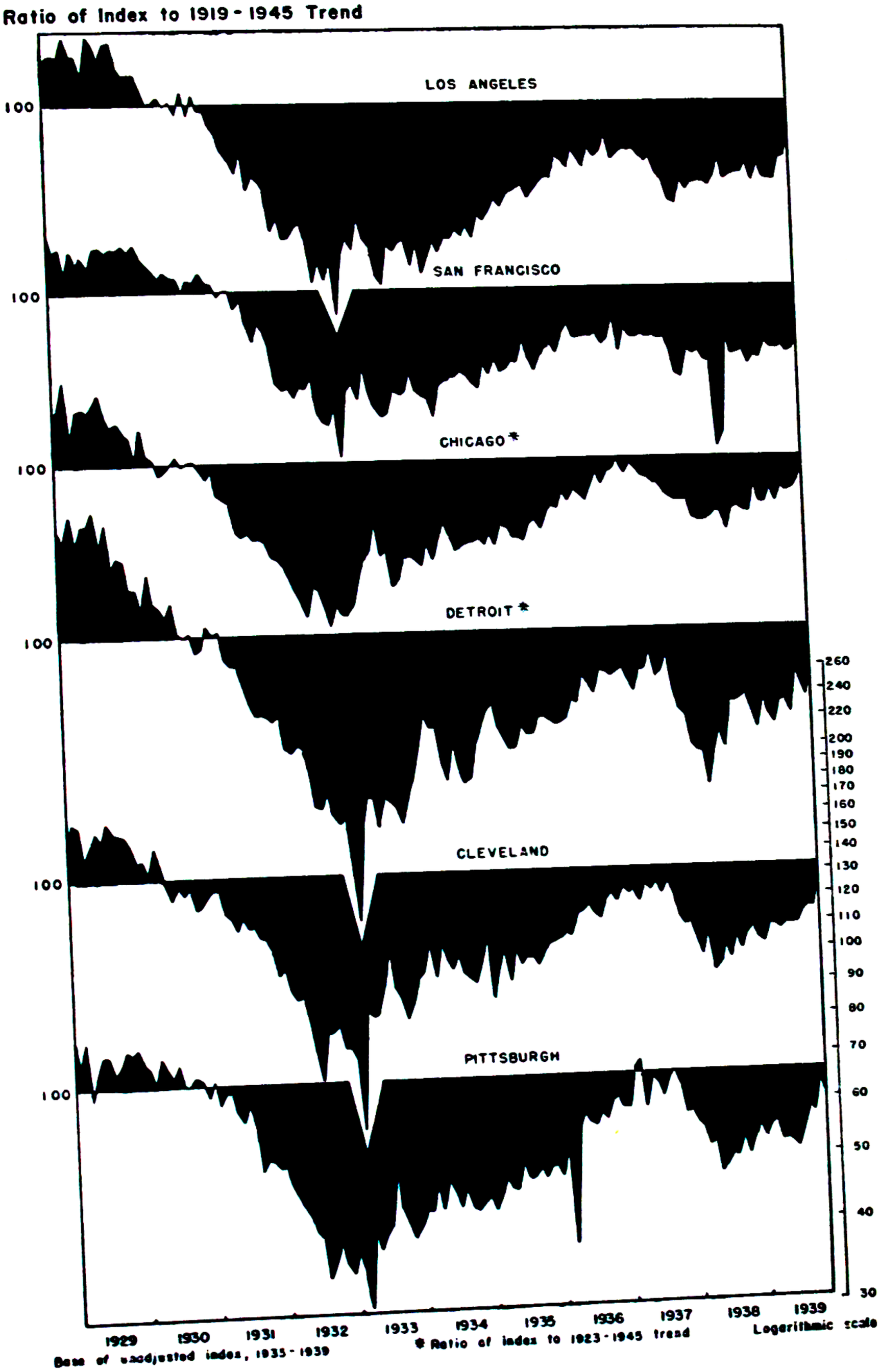
had wider fluctuations than that for other areas. Elsewhere, apparently, the sale of goods relatively necessary to consumers stabilized sales over the year, whereas in San Francisco such stabilizing influence was not existent in the same degree.

CHART 16

Department Store Sales in Six Industrial Areas, 1929-1939

Ratio of Index to 1919-1945 Trend



Base of unadjusted index, 1935-1939

* Ratio of index to 1923-1945 trend

measurements for the latter are included in table 39. The mean and coefficient of Detroit's power sales are 85.7 and 27.5 per cent. In this case, as in earlier ones, Detroit power sales seem substantially less variable than employment (table 39) and, in fact, are also less variable than debits and store sales. Nonetheless, the variance of Detroit's power sales is large. However, it is significant that only in this area are power sales sufficiently like the other series to permit comparison. Apparently all aspects of economic life in Detroit are so colored by its principal industry that even power sales (normally displaying a pattern of its own and different from other series) follow along with it.

TABLE 39

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED INDUSTRIAL EMPLOYMENT AND POWER SALES VALUES, 1929–1937 CYCLE

Area	Power sales		Industrial employment	
	Mean	Coefficient of variation (per cent)	Mean	Coefficient of variation (per cent)
Chicago	88.6[a]	20.3[a]	80.6	18.7
Detroit	85.7	27.5	87.6	35.0
Cleveland	70.2[a]	24.5[a]	80.3	17.9
Pittsburgh	85.2[a]	26.4[a]	82.2	16.7

SOURCE: Derived from data in appendix ii.
[a] Not comparable by rules employed in this study because of an extra cycle.

The measures of the distributions of employment and store sales display atypical similarity in this 1929–1937 cycle, perhaps as a result of the length and severity of the cycle. The greatest difference is in Detroit where store sales have a lower mean and coefficient of variation than employment (means of 81 as opposed to 88 per cent and coefficient of variation of 29 as opposed to 35 per cent). In other cases the differences are much smaller, and in Cleveland and Pittsburgh the differences between the means of employment and store sales are 1 per cent or less. The fact that they are similar and that in Detroit the sales mean is lower, whereas in Chicago the sales mean is a full 5 per cent higher, suggests that in the latter area transient customers are of somewhat greater significance.

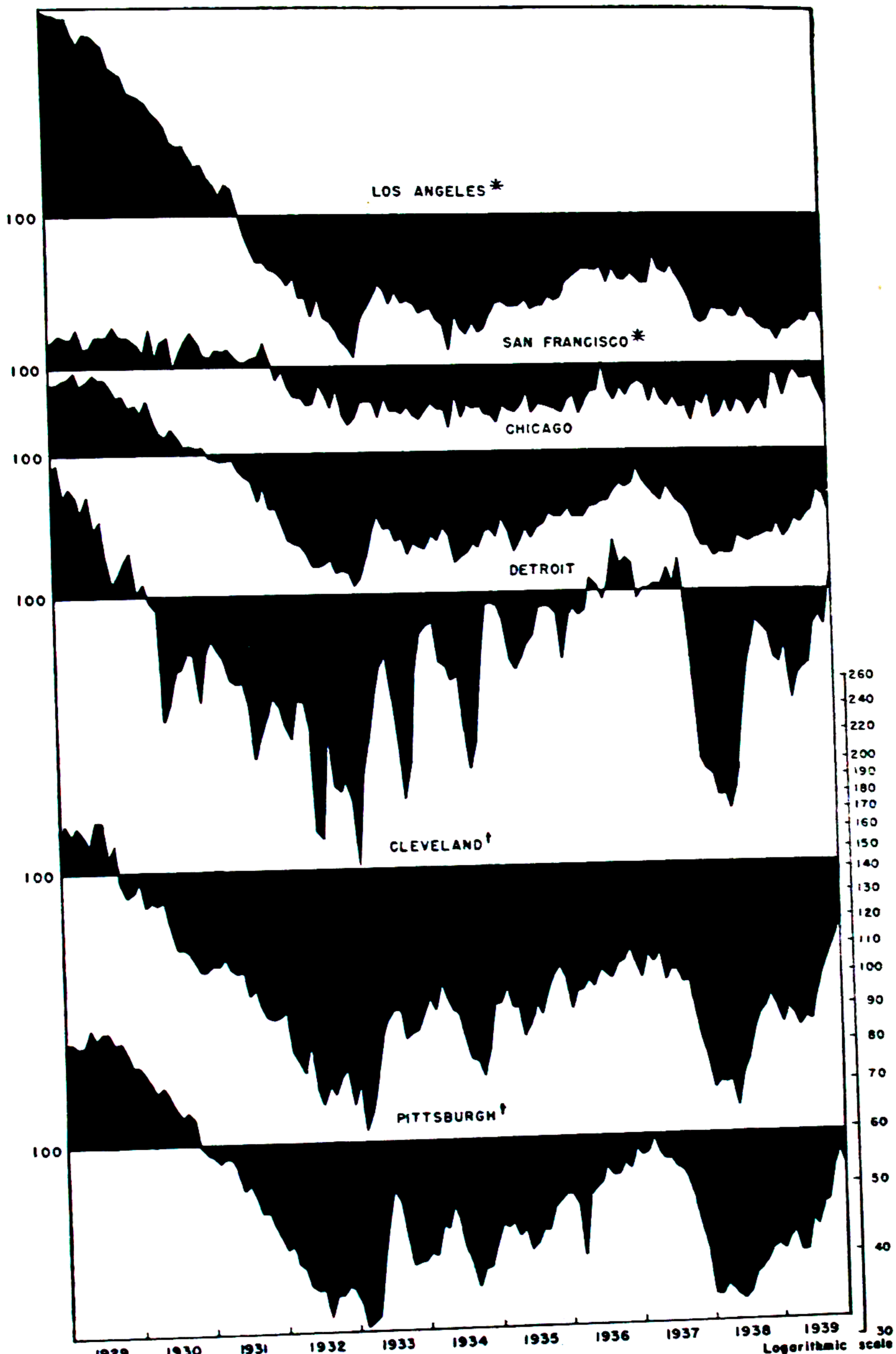
Chart 17 clearly shows the minor cycle that occurs in power sales in Pittsburgh, Chicago, Cleveland, and Los Angeles lasting from the deep trough of early 1933 to the milder one following some twelve months later. This movement is attributed by Schumpeter[18] to a number of

[18] Schumpeter, *Business Cycles*, Vol. II, p. 1006.

CHART 17

Power Sales in Six Industrial Areas, 1929-1939

Ratio of Index to 1920-1945 Trend



Base of unadjusted index, 1935-1939

* See footnotes to Chart 12

† See footnotes to Chart 12 - continued

forces and events: to inflationary anticipations, public spending, inventory restocking, and especially to reaction to excesses of the previous deflation. In commenting upon the movement of physical output during this period (which he measures by an electric power production series), Schumpeter notes that the recovery came six months earlier than "we should have expected"[19]—in the spring of 1934. Chart 17 shows that in the industrial areas studied, a sustained recovery did not begin until fall in Cleveland, Los Angeles, Chicago, and Pittsburgh; also the decline and stagnation in the first half of 1935 noted by this author did not appear with sufficient severity to justify identification as a minor cycle in these areas. Had Schumpeter referred to area data, this stagnation, explainable principally in terms of political influences, would not have seemed to be so significant. The absence of an identifiable cycle in employment at this time is consistent with Schumpeter's view that increasing wage rates and a labor-saving rationalization of industry had been proceeding during the depression. Also, in Los Angeles and Pittsburgh, power sales did increase more rapidly than employment and, hence, offered substantiation for Schumpeter's hypothesis, but in the other areas this more rapid advance of power sales was not so clearly evident. Moreover, the collapse of power sales in the summer of 1933 is by no means universal nor so apparent in employment, a fact which suggests that in this case reduced output may have been achieved through reduced power consumption as well as a decreased length of the work week. Of the four areas displaying this minor cycle in power sales, Chicago and Los Angeles fluctuated least (variations of 5.4 and 5.6 per cent) and Cleveland and Pittsburgh most (11.3 and 12.5 per cent). Relative amplitude in this case logically followed the division between durable and nondurable centers.

The 1932, 1933–1938, 1939 Cycle

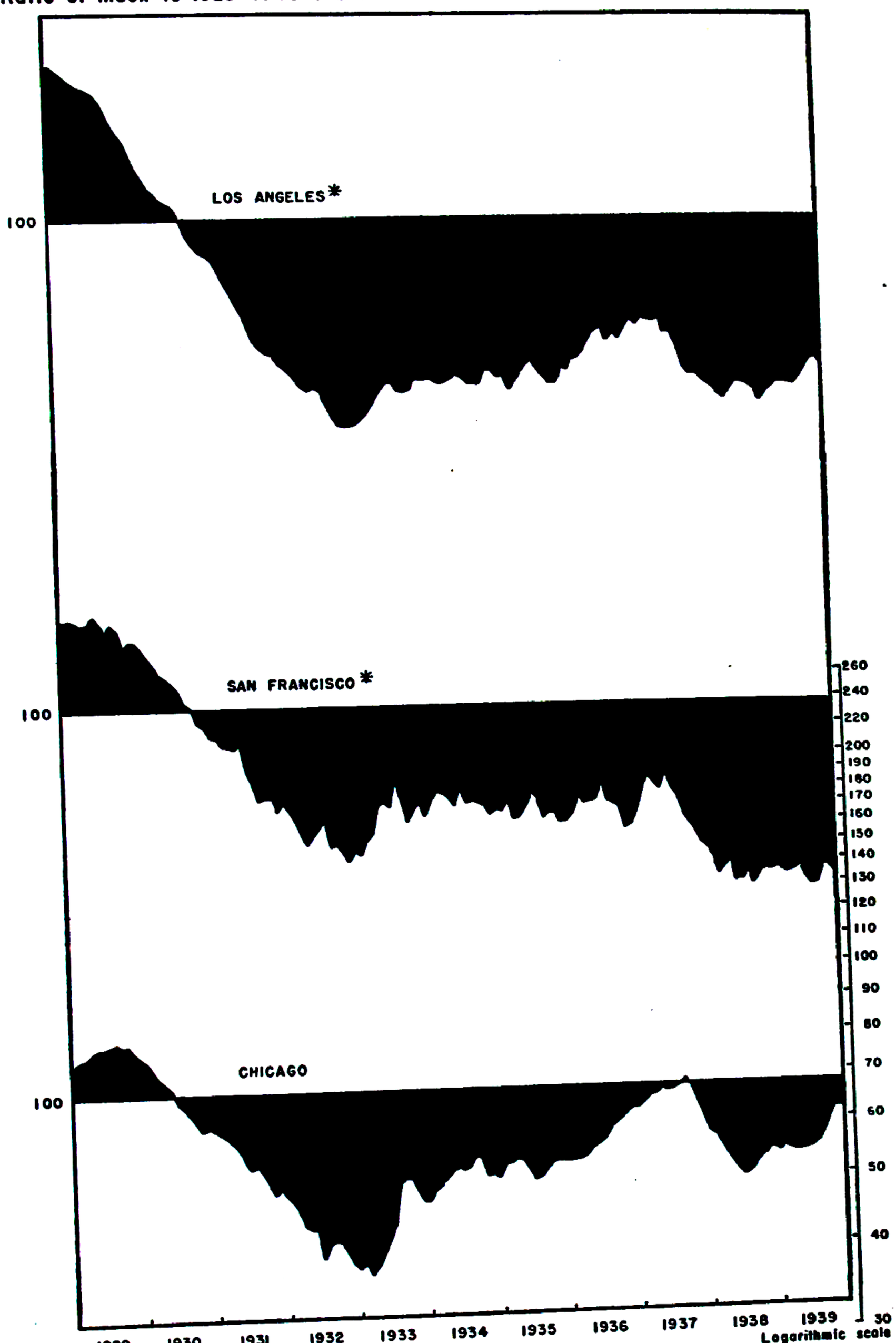
The cycle extending from the trough of 1932, 1933 to the trough of 1938, 1939 provides a large number of cases in which valid comparisons between all six areas may be made. Of the two value series, debits and store sales, only San Francisco's store sales are noncomparable (its terminal trough was delayed seventeen months).[20] Table 40 presents the mean and variation for these two series, and the series themselves are to be found on charts 15 and 16. As in earlier cases, store sales tend to have higher means and to fluctuate somewhat less than debits. In this cycle as in the others, Chicago tends to fluctuate less and Detroit more than most of the other areas. Somewhat surprising, however, is that

[19] *Ibid.*, pp. 1009–1010.
[20] Cf. above, chap. iii, for turning-point limits.

CHART 18

Industrial Employment in Six Industrial Areas, 1929-1939

Ratio of Index to 1923-1945 Trend



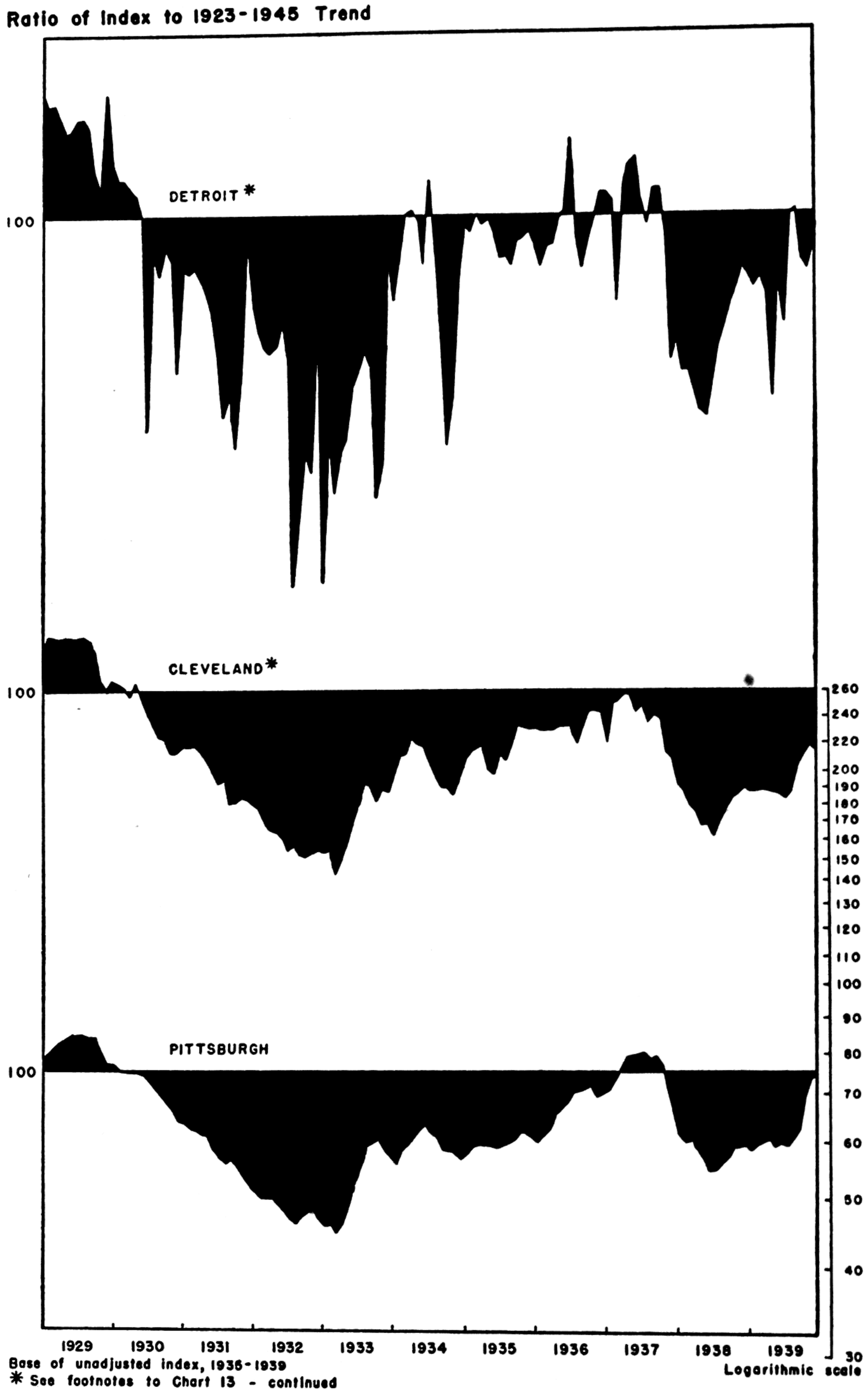
Base of unadjusted index, 1935-1939

* See footnote to Chart 13

CHART 18 - CONTINUED

Industrial Employment in Six Industrial Areas, 1929 - 1939

Ratio of Index to 1923-1945 Trend



Base of unadjusted index, 1936-1939

* See footnotes to Chart 13 - continued

Pittsburgh's store sales fluctuate slightly more than Detroit's. This situation appears to be due partly to the nearly full recovery that Pittsburgh experienced after 1933 (this area was the only one to reach trend at this peak) and partly to its weakness in late 1933 and 1934. In this instance, Pittsburgh reacted as a producers' durable area would be expected to react, reflecting great instability. Pittsburgh's "normal" pattern seems to show up, though less markedly, in its debits series, for there its variation exceeded San Francisco, Cleveland, and Chicago by a significant margin and was only slightly less than Los Angeles. It is worthwhile to note here that the remaining series, employment and power sales, also give Pittsburgh an unstable record in this cycle.

One factor, hitherto apparently of negligible importance, presents itself as possibly of great value in explaining Pittsburgh's reaction and one which would be of interest to forecasters of conditions in that area. It was the first time that a decided and measurable difference existed between the amplitude of the upswing in the area's steel output and the steel output of the nation as a whole. In earlier years increases and decreases in Pittsburgh's steel output paralleled those of the nation, but in the upswing from 1933, while the nation's output of steel ingots and steel for castings rose 270 per cent, Pittsburgh's (Allegheny County) rose nearly 420 per cent.[21] It is impossible to determine conclusively the cause for this divergent reaction, but it is possible that it is associated with the monopolistic organization existent in the industry. In the growing market for steel in this period, producers may have preferred to utilize available Pittsburgh capacity rather than operate geographically separated plants at low levels. Under competitive conditions, such a practice would be unlikely or impossible. Also, following 1934, rapid technological advance took place in the industry, especially in the Pittsburgh area.

Despite these rather striking matters concerning Detroit and Pittsburgh, table 40 does no particular violence to a ranking of the areas by amplitude developed on the bases of previous data. Detroit still is extremely unstable and Chicago, very stable. San Francisco has heretofore provided a few good comparisons, but, from these data, it appears to fall into the relatively stable group. Los Angeles still seems to have much in common with Pittsburgh and, to a lesser degree, with Cleveland so far as amplitude is concerned, though Los Angeles' flat trough in debits (chart 15) should be noted as an outstanding and almost unique characteristic.

All six areas have comparable employment series in this 1933–1938 cycle, and Los Angeles, Chicago, Cleveland, and Pittsburgh have com-

[21] Data obtained from the American Iron and Steel Institute, New York.

parable power sales cycles. Again the area with widest movement is Detroit, though the onus of variability is partly relieved by the fact that as early as the fall of 1934, Detroit reached trend (chart 18). Thereafter it remained at generally high levels, and in the years 1936 and 1937 there were ten months in which employment exceeded trend by 5 to 20 per cent. In fact, the total factory sales of passenger cars exceeded trend in 1935, 1936, and 1937. The high level sustained in these years makes the severe downswing starting late in 1937 understandable.

TABLE 40

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED BANK DEBITS AND DEPARTMENT STORE SALES VALUES, 1933–1938 CYCLE

Area	Bank debits		Department store sales	
	Mean	Coefficient of variation (per cent)	Mean	Coefficient of variation (per cent)
Los Angeles	69.3	18.6[a]	71.3	11.5
San Francisco	74.0	13.9	77.5	9.5[c]
Chicago	72.2	16.6[b]	81.2	11.1
Detroit	61.6	25.6	72.2	16.2
Cleveland	64.4	14.1	77.2	14.2
Pittsburgh	71.2	18.1[b]	75.6	17.9

SOURCE: Derived from data in appendix ii.
[a] Terminal trough in 1939.
[b] Original trough in 1932.
[c] Terminal trough in 1940.

As noted in the discussion of the 1929–1937 cycle, Detroit is the only area whose power sales do not reflect a minor cycle in 1933 and 1934. Thus, this area again provides the only power sales cycle comparable with employment. In the remaining areas the upturn culminating in 1936 or 1937 occurred nineteen months later than in employment. Repetition of the reasons for these relationships is unnecessary. Measures of the distribution of the values of the 1934–1936, 1937 cycle and the 1933–1937 period (ignoring the minor cycle) yield almost identical results, a fact caused by the insignificance of the minor cycle and from the failure of these measures to reflect the time sequence of the values. Trend adjustment accounts for the wide divergence between the means of the two series in Cleveland, where the employment mean exceeds the power sales mean by 25 per cent. However, trend adjustment cannot account for the even greater difference in the means for Los Angeles (power sales exceeds employment by 29 per cent), since the trends are almost the same. Also, charts 17 and 18 show, in Pittsburgh as well as in Cleveland, that, whereas the downswing between 1929 and 1933 in power sales was

more rapid than employment, power sales did not recover more rapidly between 1933 and 1937, but rather at approximately the same rates as employment. This made the values of Cleveland's power series between 1933 and 1937 much lower than its employment values, since both series stood at approximately the same level in 1929. In Pittsburgh, power sales were higher in 1929, so that the failure to recover more rapidly after 1933 did not cause lower means.

This noticeable asymmetrical relationship between these two series arises out of emphasis on work-spreading and work-creating practices,

TABLE 41

MEASUREMENTS OF THE DISTRIBUTION OF ADJUSTED INDUSTRIAL EMPLOYMENT AND POWER SALES VALUES, 1933–1938 CYCLE

Area	Industrial employment		Industrial and commercial power sales	
	Mean	Coefficient of variation (per cent)	Mean	Coefficient of variation (per cent)
Los Angeles	59.6	10.9	76.0	8.2[a]
San Francisco	67.8	11.5	....	....
Chicago	79.5	14.1	79.7	8.4[a]
Detroit	84.5	25.8	84.8	21.6
Cleveland	81.2	12.3	63.2	13.4[a]
Pittsburgh	83.0	14.2	76.4	15.6[a]

SOURCE: Derived from data in appendix ii.

In both series, Los Angeles' terminal trough occurs in 1939. Employment in San Francisco likewise terminates in 1939.

[a] 1933–1934 minor cycle ignored.

both in law and in public opinion. Though in earlier years some pressure to maintain employment certainly existed, in this period it was well implemented. It seems that the use of power data as a measure of output is of questionable validity, and that sometimes governmental and social pressures are sufficient to alter the cyclical reactions of the series significantly.

VARIATION OVER THE DECADE

As in the 1919–1929 period, a consideration of the relative stability of the areas over the 1929–1939 period, without reference to particular cycles or turning points, provides added useful information on stability. Where business commitments are made which affect operations over long intervals, knowledge of variation in general conditions over long periods may be as important to decisions as knowledge of variation in any particular cycle.

Table 42 provides the standard deviation for the 1929–1939 period for each series and area. Perhaps the most obvious, and least unexpected, fact shown is Detroit's uniformly high variation (its standard deviation is always highest, from 7 to 60 per cent above the next highest). Detroit differs from the other areas the least in store sales, for there its variation approximates those in Los Angeles and Pittsburgh. Related to this high variation in Detroit is the fact that in this area there is comparatively little difference in the variation reflected by the four series; the factors destabilizing Detroit apparently exert force approximately equally on

TABLE 42

THE STANDARD DEVIATION OF ADJUSTED INDEX VALUES, FOUR SERIES IN SIX AREAS, 1929–1939

Area	Bank debits	Department store sales	Industrial and commercial power sales	Industrial employment
Los Angeles	26.1	21.0	16.2	18.9
San Francisco	22.7	13.7	7.1[a]	12.8
Chicago	25.4	16.9	13.4	17.5
Detroit	30.9	22.6	25.5	30.3
Cleveland	27.9	17.3	18.4	17.7
Pittsburgh	23.8	20.1	19.4	16.2

SOURCE: Derived from data in appendix ii. Data are adjusted for 1929–1939 trend only.
[a] Noncomparable, includes residential power sales.

all aspects of activity so that all measures are destabilized, not just those most closely related to the factors responsible for variance.

Table 42 also definitely shows San Francisco to be the most stable area, even discounting its extremely stable, but noncomparable, power sales series. Its standard deviation is from 5 to 21 per cent below the next most stable area (usually Chicago). Unlike Detroit, there is a wide percentage difference between its greatest and least standard deviation (excluding power sales). Divergent reactions of the series in this case demonstrate the fact that here no single force is of such dominating influence as to destabilize all indexes of business activity to the same degree. It is significant to note that the debits series is by far its least stable one, pointing again to the fact that financial activities are a more important factor in this area than in many others.

Chicago is next most stable, when stability is measured by the standard deviation, but measurably less so than San Francisco. But the two areas have much in common, for aside from stability, both have relatively large debit variations; and in both areas the spread between the variation of the several series is relatively large.

Pittsburgh, Cleveland, and Los Angeles follow (in that order) San Francisco and Chicago in stability measured by average rank. Among these three, however, no great difference exists, and it would be difficult indeed to justify a real distinction between them even though the average ranks of their standard deviations are 3.25, 4.00 and 4.25, respectively. Both Los Angeles and Cleveland have wider ranges between their deviations than Pittsburgh, indicating that Pittsburgh's principal activity, steel production, may color all activity as automobile production appears to in Detroit.

Taking the series in each area, the dispersion is considerably greater for debits than for power sales, store sales, and employment, which all have roughly the same average. In Detroit, however, variation in employment is nearly as great as in debits. Moreover, no series has consistently the lowest variation. Power sales are most stable in Los Angeles and Chicago; employment, in San Francisco (excluding power sales which is noncomparable); store sales, in Detroit and Cleveland; and employment, in Pittsburgh.

At several points in the foregoing chapter an unusual characteristic of the 1929–1937 cycle and the 1933–1938 cycle was noted. This was the delayed recovery, or flat trough, in Los Angeles that is so obvious in chart 18 and very noticeable in chart 16 and even in chart 15. It appears that this flat trough is closely related to the depression in markets (domestic and foreign) for certain export items particularly important to Los Angeles. Net petroleum exports, totaling one sixth of the total exports of southern California in 1934, declined through 1935; data on the value of citrus production suggest that this equally important export also failed to recover from the trough at a rate comparable with other items.[22] In addition, the value of the output of the movie industry, which in normal times was the largest single export of the area, also failed to make a recovery that was conducive to rapid recovery generally; it did not move upward as rapidly as most industries.

Conclusions

This 1929–1939 period provides more valid comparisons of the areas than the earlier decade. Not only is this era closer to the present and, hence, within more reliable limits of memory, but it also witnessed an increasing popularity of quantitative economic studies. Conclusions with

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[22] Total exports are taken from R. P. Terril, "The Interregional Balance of Payments of Southern California, 1920–1934, table 16 (Ph.D. thesis, Stanford University). Net petroleum exports are derived from unpublished data of the Long Beach Harbor Department and from the Board of Harbor Commissions, Los Angeles, *Annual Statistical Reports*. Citrus data are derived from California Fruit Growers Exchange, Marketing Research Department, *Statistical Information on the Lemon Industry*, and *Statistical Information on the Orange Industry*.

respect to cyclical characteristics and causes in this period are, therefore, more defensible and probably generally more valid than those for the earlier period. If consistency in relative cyclical characteristics between the areas in the two periods exists, the conclusions drawn with respect to the 'twenties are probably justifiable. To the extent that the two periods appear to offer different characteristics for any or all areas, ample justification for such differences must be available before conclusions based upon the evidence of the 'twenties be considered definitive. Fortunately, there appears to be no significant instance in which the results of the previous chapter are inconsistent with the conclusions which may be drawn from the material presented in this one.

First, Detroit's instability is extremely marked. This is beyond doubt a consequence of its very highly developed automobile industry. In this area the individuality of the separate measures of cycles appears to be outweighed by the dominant force of its basic industry. Of all the areas, Detroit reacts more as it would be expected to, reasoning that economic pattern is the primary determinant of cyclical pattern.

Second, both Chicago and San Francisco appear to reflect unusual stability, though both are subject to fairly strong influence of disturbances in capital or money markets. San Francisco's claim to differential stability, however, is based on fewer observations than Chicago's, and the future may show that its stability in this 1929–1939 period is nonrepresentative. On the other hand, both areas do have many similarities, and, in spite of wide geographic separation and certain important economic differences, these two cities may equally deserve to be rated as comparatively stable areas. In these, unlike Detroit and Pittsburgh, there are wide differences in the amplitude of the cycle as measured by the several series. Here, evidently, a multitude of forces are at work, affecting in different measure the various institutions and phenomena which determine the movement of the several criteria by which cycles may be measured.

Third, in spite of notable differences in the economic pattern of Los Angeles, Cleveland, and Pittsburgh, the cyclical patterns of these areas are much alike. Cleveland and Pittsburgh are old industrial areas, whereas Los Angeles is a new and rapidly growing one. Pittsburgh's economy is concentrated in a basic durable producers' goods industry as is Cleveland's, but in the latter area the goods are at a stage somewhat closer to the consumers' goods stage. Cleveland is principally a metal-fabricating area. Los Angeles is much more diversified than either of the other two, and is concentrated more in nondurable consumers' goods production. It is difficult to believe that areas so different could reflect such similar cyclical patterns, yet evidence points to a striking similarity. But

in Pittsburgh, the economy shows signs of response to a few or to one dominating force. In this respect alone, Pittsburgh resembles Detroit more than Los Angeles and Cleveland.

Fourth, although in all areas bank debits present the most sensitive index of cyclical pattern, no single series presents the least vulnerable picture. In some instances, it is employment, in others power sales, and once it is store sales. This last is somewhat surprising in view of the importance of price change to this series. Only the extreme stability of the quantity of consumer purchases can account for it.

CHAPTER VII

THE PREWAR SLUMP AND WARTIME EXPANSION, 1937–1945

IN MANY respects this period presents a simpler analytical problem than any of the earlier eras because of the single important cause responsible for business conditions—government spending. Both the underlying national cycle and regional fluctuations represent reactions first to defense and wartime expenditure, and then to their sudden cessation. Thus, the discovery of the immediate causes requires little more than the determination of the changes in the direction and amount of governmental expenditure arising from the necessities of war. Other cycles originate in much more complex manners, and the basic force is generally the subject of lengthy debate and general disagreement.

These factors may suggest that the business movements of this period are more like the erratic or accidental fluctuations discussed in some detail in chapter i and, hence, that they are not true cycles. Such an attitude must be based upon the invalid belief that a cycle, by definition, must be the result of many complex causes, and can never come about from a simple, possibly single, cause. However, most business series present a movement that resembles that of earlier periods in many important characteristics. Certainly the process by which the initial stimulus to expansion was carried throughout the system is similar in this period to that in others, and the conditioning effects of institutional factors on reactions to expansive forces are similar. Even though it is well known that war is the underlying cause of this cycle in its main characteristics, it is like other major fluctuations; the processes of both expansion and contraction and the consequences to employment and to the structure of the economy are all alike in kind. Thus, there is no sufficient reason to exclude this movement from the cycles of the 1919–1945 period which are the subject of this study.

REPERCUSSIONS OF WARTIME EXPENDITURE

Table 43 presents total government expenditures together with some of its important components for the years 1937 through 1946. The consistent growth in the total of governmental expenditures, culminating in a sevenfold increase by 1944, is the underlying cause mentioned above. Whereas government spending accounted for 16 per cent of gross national product in 1937, by 1944 it had reached 49 per cent. During the war years of 1942 through 1945, the government spent 40, 48, 49, and 44 per cent of gross national product, and in the nonwar years, 1937 through

1941 and 1946, it spent 16, 19, 19, 18, 23, and 23 per cent, respectively. Obviously, the role of government as an economic determinant was much enlarged by the war. Table 43 also shows that the most elastic element

TABLE 43

GOVERNMENT EXPENDITURES, UNITED STATES, 1937–1946
(Millions of dollars)

Year	Total, federal, state, and local[a]	Federal			
		Total[b]	Compensation of employees	New construction	Other net purchases from business
1937	14,705	7,225	3,036	529	893
1938	16,523	8,451	3,529	476	1,211
1939	17,270	8,955	3,444	537	1,116
1940	18,332	10,094	3,537	974	1,581
1941	28,712	20,545	5,046	3,588	7,966
1942	63,994	56,150	10,791	9,296	30,763
1943	93,390	85,979	21,228	5,358	53,233
1944	103,116	95,559	28,059	1,761	58,493
1945	93,189	84,929	30,501	1,440	43,240
1946	46,779	36,584	14,862	835	6,829
		State and local			
1937	.....	8,224	3,889	1,410	1,739
1938	.....	8,850	4,121	1,488	1,861
1939	.....	9,303	4,185	1,809	1,917
1940	.....	9,095	4,280	1,559	1,924
1941	.....	8,974	4,368	1,416	1,997
1942	.....	8,732	4,442	1,115	2,086
1943	.....	8,353	4,622	702	2,054
1944	.....	8,504	4,883	566	2,097
1945	.....	9,130	5,324	608	2,223
1946	.....	11,200	6,349	1,316	2,318

SOURCE: United States Department of Commerce, *Survey of Current Business, Supplement*, July, 1947, p. 23.

[a] Federal grants-in-aid to state and local governments are reflected in federal expenditures and in state and local expenditures. Total government expenditures have been adjusted to eliminate this duplication.

[b] All items entering into the totals for federal and for state and local expenditures are not shown here, which accounts for the discrepancy in the totals. Items omitted are: Domestic sales of surplus consumption goods and materials, Net purchases from abroad, Transfer payments, Grants-in-aid to state and local government, Net interest paid, Subsidies less current surplus of government enterprises.

in government expenditure was that of the federal level; of federal expenditures alone, that entitled "Other Purchases from Business" was most variable, increasing to a peak in 1944 that was sixty-five times the 1937 volume. Wages and salaries paid increased only nine times over this same period, whereas new construction moved to an earlier peak in 1942, some eighteen times its 1937 figure. In 1944, purchases by the federal

government from business (excluding construction) had reached 28 per cent of gross national product. In the prewar year 1941, in which this value was highest, it was only slightly above 6 per cent.

Another striking aspect of the role of government in this period is the comparison of the absolute increase in gross national product and in the government expenditure item. Between 1937 and 1944, the former increased approximately 120 billion dollars. In the same period, total federal expenditures increased by roughly eighty-eight billion dollars. Therefore, a vast portion of the total increase of national product can,

TABLE 44

PERSONAL EXPENDITURE BY TYPE OF PRODUCT, UNITED STATES, 1937–1946
(Millions of dollars)

Year	Total	Durable goods	Nondurable goods	Services
1937	67,121	7,005	35,232	24,884
1938	64,513	5,754	34,032	24,727
1939	67,466	6,729	35,258	25,479
1940	72,052	7,854	37,594	26,604
1941	82,255	9,750	43,960	28,545
1942	90,835	6,845	52,962	31,028
1943	101,626	6,515	61,205	33,906
1944	110,417	6,755	67,190	36,472
1945	121,698	7,977	75,298	38,423
1946	143,670	14,917	87,061	41,692

SOURCE: United States Department of Commerce, *Survey of Current Business, Supplement*, July 1947, p. 44.

in a sense, be assigned to this growth in expenditure as a cause.[1] The story of business cycles in this period is, thus, largely the story of the nature of these government expenditures and of their primary and secondary effects on the economy. The primary and secondary effects of this heavy governmental expenditure cannot be measured separately and with precision, but data bearing on their relative significance are available. Total personal consumption expenditure from 1937 to 1946, together with personal expenditure by type of product or by service, is presented in table 44.

Expenditures by individuals for durable goods reflected no wartime expansion throughout the period, a result of the entire priority and rationing program; on the other hand, a rapid expansion of expenditures on nondurables and services occurred. Thus, the tremendous expansion of personal incomes, itself a consequence of the war effort and wartime

[1] Obviously, in only a very crude sense is this correct, for other elements of income may have been altered significantly.

TABLE 45

Indexes of Income Originating in Durable Goods Manufacture, United States, 1937–1946
(1937 = 100)

Durable goods	1937		1938	1939	1940	1941	1942	1943	1944	1945	1946
Total	9,303[a]	100.0	67.2	90.7	123.5	208.3	296.2	395.1	402.9	314.4	237.0
Lumber and timber basic products	561	100.0	76.3	87.5	106.1	158.1	193.2	203.7	207.0	199.3	253.8
Furniture and finished lumber products	508	100.0	83.3	100.0	108.5	150.6	169.7	179.5	194.5	195.1	240.4
Stone, clay, and glass products	649	100.0	77.3	102.0	116.6	165.2	178.9	181.0	173.0	171.0	229.4
Iron and steel, and their products	2,586	100.0	61.6	87.4	118.2	195.2	266.2	348.0	346.8	286.6	227.3
Nonferrous metals and their products	702	100.0	62.7	84.6	113.0	171.1	210.7	271.1	268.4	227.5	239.5
Machinery (except electrical)	1,759	100.0	70.9	84.8	124.0	218.9	305.8	336.4	329.4	290.5	254.0
Electrical machinery	908	100.0	72.6	93.6	125.1	210.9	274.4	366.5	409.0	345.0	247.7
Transportation equipment (except automobiles	332	100.0	79.5	119.6	244.9	685.5	1,865.1	3,629.2	3,750.6	2,341.3	721.1
Automobiles and automobile equipment	1,298	100.0	53.9	91.5	123.4	182.1	156.2	102.5	108.9	85.4	96.1

Source: United States Department of Commerce, *Survey of Current Business, Supplement*, July 1947, p. 26.
[a] Actuals expressed in millions of dollars.

financial policy and, hence, a secondary effect of government spending, gave rise to a substantial stimulus to nondurable and service activities.

At the same time that the consequences of rising consumer expenditure made itself felt principally upon nondurable goods and services, income created by durable goods operations more than doubled, a fact attributable to the direction taken by government expenditure. Table 45 presents indexes of income created by durable goods manufacture from 1937 through 1946, together with the absolute income created by durable goods as a whole in those years. By far the larger part of the increases recorded in such industries as iron and steel, nonferrous metals, machinery, and transportation equipment is a direct consequence of governmental expenditure.

Another view of the primary and secondary results of the war effort may be obtained from the study of the national income by industrial origin (table 46). Comparing 1937 and 1946, little change in the proportionate share of income traceable to the individual industries is apparent. But, comparing these items with 1943 provides several striking contrasts. Particularly impressive is the enormous significance of durable goods in 1943, of the size of income from government in that year, and the relative fall in significance of services, finance, and trade.

Wartime Shifts of Population, Industry, and Income

Wartime emphasis upon durable goods manufacture and the expanded role of government spending was associated with important geographic shifts of population, industry, and income. Generally speaking, these shifts were made possible by the changing geographic distribution of facilities as public construction assumed relatively greater significance and as the total volume increased. Between 1942 and 1943, 78 per cent of all construction was public (as opposed to a normal peacetime volume approximating 20 per cent), and the total reached 13.3 billion dollars in the peak year, 1942. Public construction of military installations tended to concentrate in less densely populated, less urbanized areas, weather conditions permitting, and the location of publicly financed war plants was determined on the basis of resource requirements and uncongested living conditions. These factors, therefore, tended to hasten the growth of less densely populated areas.

Another force was exercised by private construction which, though of relatively less importance, amounted to five and three billion dollars in 1941 and 1942, respectively. The location of privately financed wartime facilities was made with a view toward peacetime use. These investments, therefore, were made largely upon the basis of forces at work in the prewar years which might be expected to reëstablish themselves in the

TABLE 46

National Income by Industrial Origin, 1937, 1943, and 1946

(Totals in millions of dollars)

Industry	1937 totals	Per cent of total	1943 totals	Per cent of total	1946 totals	Per cent of total
Total[a]	73,627	100.0	168,262	100.0	178,204	100.0
Agriculture, forestry, and fisheries	7,249	9.8	14,524	8.6	18,549	10.4
Mining	1,941	2.6	2,739	1.6	3,118	1.7
Contract construction	2,017	2.7	5,605	3.3	6,063	3.4
Manufacturing	19,304	26.2	57,567	34.2	47,653	26.7
Durable goods	9,303	12.6	36,757	21.8	22,050	12.4
Nondurable goods	10,001	13.6	20,810	12.4	25,603	14.4
Wholesale and retail trade	11,938	16.2	21,363	12.7	32,841	18.4
Finance, insurance, and real estate	7,943	10.8	12,183	7.2	14,753	8.3
Transportation	4,530	6.2	10,593	6.3	10,202	5.7
Communications and public utilities	2,713	3.7	3,915	2.3	4,747	2.7
Services	8,049	10.9	12,242	7.3	17,020	9.6
Government and government enterprises	7,795	10.6	27,272	16.2	23,019	12.9

Source: Derived from data in Department of Commerce, *National Income Supplement to Survey of Current Business*, July, 1947, p. 26.

[a] Because of the inclusion and exclusion of certain categories, the items may not add up to the total figure given.

postwar period. Though some tendency toward decentralization existed in the prewar decade, the relative growth of less densely populated areas which would have occurred in the absence of war would never have approximated that which actually did take place.[2]

Therefore, between 1939 and 1946, the proportion of the total population, of total income, and of total national industrial capacity accounted for by the Pacific Coast states increased significantly. Between these years, California's income payments increased from 7.1 to 8.8 per cent of the nation's, its population from 5.2 to 6.8 per cent, its manufacturing employment from 3.7 to 4.7 per cent, and its durable goods employment from 3.8 to 5.1 per cent.[3] Of the states in which the industrial areas studied are situated, actually only Illinois and Pennsylvania decreased relatively, but neither Ohio nor Michigan experienced growth comparable to that of California.

Just as the war profoundly affected the economies of the states, it also reacted importantly upon the areas. The results upon population, income, and employment in the states were more conditioned by public investment and expenditure, but private investment and expenditure are more nearly reflected by the changes in the industrial areas. For this reason the wartime changes in the areas resemble the accentuation of prewar tendencies more than is true of the states. For example, Illinois declined relatively in population and income, but, contrarily, Chicago grew rapidly. The possibility of divergence on this basis may be overstated, however, for events in the states, as primary market centers for most of the areas studied, can hardly be expected to leave the areas unaffected.

The tremendous expansion in the western areas, as opposed to that of the eastern areas, is unquestionably a reflection of the differences in the ages of the areas and of the industrial pattern of each. The war called forth vast increases in durable goods production. Eastern areas, as prewar durable goods centers, were called upon to change the character of their durable goods output as well as to increase it; but western areas, in order to make their contribution, necessarily developed additions to their industrial capacity. This does not mean that no new investment in industry occurred in eastern areas during the war; on the contrary, Pittsburgh, the center of steel production, gained a large share of the half billion investment in new iron and steel plant that Pennsylvania

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[2] The data presented in this paragraph are taken from United States Department of Commerce, *Geographic Distribution of Construction in the United States, 1939–1947* (Washington, 1948), pp. 14–15.

[3] *Ibid.*, tables vi, vii; and United States Department of Commerce, *Employees by State in 1939 and 1946 in 20 Major Manufacturing Groups with 1939 Data on Employees by State in 448 Single Manufacturing Industries from the Census of Manufactures* (Washington, 1948), pp. 1–4.

experienced during the war.[4] San Francisco's wartime expansion, largely in shipbuilding, was almost completely new; Los Angeles' expansion, primarily in aircraft, but to a significant degree in ships, petroleum, and iron and steel, though not new, was so vast that it could hardly be called conversion of existing facilities. This last phrase is applicable as a description of the wartime changes of Cleveland or Detroit. In the light of these facts, the wartime increase of population in the western areas does not seem to be accidental or unexplainable. In addition, the fact that in the prewar period the western areas were growing much more rapidly than the eastern areas should not be overlooked. This consideration tends to place their wartime growth in the proper light, as merely a hastening of processes already under way.

The percentage increases in population of the areas between 1940 and 1947 are shown in the following tabulation.

Area	Percentage increase
Los Angeles	32.0[a]
San Francisco	45.7[b]
Chicago	10.1[c]
Detroit	12.1[d]
Cleveland (1946)	9.9[e]
Pittsburgh	5.3[f]

[a] California State Chamber of Commerce, *Economic Survey Series No. 36* (San Francisco, 1948).
[b] Industrial Survey Associates, *San Francisco Bay Area, Its People, Prospects, and Problems* (San Francisco, 1948).
[c] Dun and Bradstreet, *Chicago* (New York, 1947), p. 5.
[d] Detroit Board of Commerce, personal letter.
[e] Real Property Inventory of Metropolitan Cleveland, *Regional Letter*.
[f] Refers to Pittsburgh Metropolitan Area only, U. S. Department of Commerce, *Current Population Reports* (Washington, 1947), Series P-21, No. 8, p. 1.

Changing Manufacturing Patterns, 1939–1946

Comparable data for each of the areas are difficult to obtain, but some are available which, though not strictly comparable, probably err similarly in each case. In 1947, the United States Department of Commerce published tabulations of materials collected by the Social Security Board which reports employment by industry group and by county under the old age and survivors' insurance program. These figures are for the first quarter of 1946.[5] They exclude certain large numbers of employees, such as domestic service workers, government employees, and those self-employed, but probably cover manufacturing employment in the areas

[4] *Geographic Distribution of Construction . . .*, p. 20.
[5] United States Department of Commerce, *Business Establishments, Employment and Taxable Payrolls Under Old Age and Survivors Insurance Program* (Washington, 1947).

satisfactorily.[6] It should be remembered, however, that these data report employment, not wage earners, so that comparison of absolute values with *Census of Manufactures* wage earner figures is invalid.

Table 47 presents percentages of total wage earners and employment, respectively, in each area represented by the various manufacturing groups in 1939 and in 1946. They show, most importantly, that for durable goods as opposed to nondurable goods, there was little change in any area other than Los Angeles, but there the change was striking. In 1939, durable goods employed only 42 per cent of the total manufacturing wage earners, but by 1946 this had increased to a little more than 60 per cent. The industry accounting for the greatest part of this increase was transportation equipment, although machinery, too, had grown relatively.[7] Nondurable goods production in Los Angeles suffered a compensating decline in relative importance, from 58 to 40 per cent of the total; food and textiles decreased most, although both grew rapidly in absolute terms.

Of the remaining areas, Chicago most resembled Los Angeles in the change in its employment pattern; however, increase in durable goods in Chicago was confined to machinery but, like Los Angeles, food and textiles both declined. Elsewhere, the changes were much less noticeable. What alterations that did occur elsewhere were generally between industries within durable and nondurable groups (e.g., the increase in printing and chemicals and the relative decrease of food in San Francisco).

The *Census of Population* provides total manufacturing employment data for the areas which are comparable with the 1946 data provided by the Social Security Board, since both cover total employment. Table 48 presents total manufacturing employment in each area for 1930, 1940, and 1946. These data show conclusively that Los Angeles changed most as far as manufacturing is concerned. Although table 47 shows that some industries decreased relatively in size, they all expanded in absolute terms far more rapidly than those in other areas, so that, by 1946, Los Angeles was the third largest manufacturing center of those studied.

That this expansion does not represent a purely temporary phenomenon born of wartime exigencies is shown by the fact that, between V-E Day, May, 1945, and December, 1946, contracts let for new industrial plants costing more than $100,000 exceeded fifty million dollars, more than in any of the six areas except Cleveland. These contracts in San Francisco

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[6] *Ibid.*, U. S. Summary, App. B.

[7] Although expansion of the air-frame industry accounts for much of this, the automobile assembly industry has increased rapidly also. From a prewar yearly output of 154,000 units, it has developed a postwar capacity of somewhat in excess of 650,000 units. (Industrial Department, Los Angeles County Chamber of Commerce, *The Automobile Assembly Industry of Los Angeles County*, Los Angeles, undated.)

TABLE 47

Per Cent of Total Wage Earners and Employment in Manufacturing Industries in Selected Areas, 1939 and 1946

Industry	Los Angeles		San Francisco		Chicago		Detroit		Cleveland		Pittsburgh	
	1939	1946[a]	1939	1946	1939	1946	1939	1946	1939	1946	1939	1946
Total, all manufacturing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Durable goods	42.1	60.1	39.5	39.6	51.5	56.2	86.8	85.1	71.3	72.7	84.4	84.3
Forest products	8.3	4.0	5.0	5.3	4.6	3.0	0.8	0.8	2.8	1.7	1.4	0.8
Stone, clay, and glass products	4.8	3.1	3.4	3.8	1.7	1.6	1.6	1.3	1.4	1.0	7.9	8.9
Iron and steel and their products, not including machinery	15.7	12.0	17.6	15.1	26.1	23.8	13.4	14.5	38.7	32.8	63.1	58.4
Nonferrous metals and their products	9.3	12.0	5.9	10.6	16.0	24.6	8.0	16.6	20.1	26.8	10.9	13.9
Machinery, not including transportation equipment	3.9	29.1	7.5	4.8	3.1	3.1	63.0	51.7	8.3	10.4	1.2	2.3
Transportation equipment, air, land, and water	57.9	39.9	60.5	60.4	48.5	43.8	13.2	14.9	28.7	27.3	15.6	15.7
Nondurable goods	17.2	8.5	23.9	18.6	13.4	11.9	3.9	4.4	6.3	5.3	7.0	5.9
Food and kindred products	16.9	9.1	9.3	11.0	10.0	6.9	1.4	1.2	10.4	6.5	0.9	1.1
Textiles and their products	2.4	1.5	2.9	2.8	2.7	2.7	0.9	0.6	1.0	1.5	0.6	0.8
Paper and allied products	6.4	5.0	8.1	12.0	8.5	9.2	2.0	2.5	4.2	4.5	2.1	2.2
Printing, publishing, and allied industries	2.8	3.6	6.5	11.5	3.0	3.9	2.4	3.7	3.2	4.1	1.5	1.6
Chemicals and their products	3.9	3.0	5.1	....	2.1	0.5	0.5	0.2	1.3	0.8	2.2	2.0
Products of petroleum and coal	4.0	4.2	0.5	....	0.5	0.4	0.2	....	0.3	....	....	....
Rubber products	1.0	1.1	1.4	1.0	2.2	1.6	0.3	0.3	....	0.1	0.1	....
Leather and its manufactures	3.3	3.8	3.1	3.5	6.1	6.5	1.6	2.0	1.9	4.5	1.2	2.1
Miscellaneous industries												

Source: For 1939, P. Neff, L. Baum, G. Heilman, *Production Cost Trends in Selected Industrial Areas* (Berkeley, 1948). For 1946, United States Department of Commerce, *Business Establishments, Employment and Taxable Payrolls Under Old Age and Survivors Insurance Program*, First Quarter 1946 by industry groups and by counties.

[a] The 1946 percentages were calculated from totals especially derived: the totals for 1946 given in the Social Security bulletins include more than what is included in data for 1939, so that those extra categories were eliminated for purposes of comparison. Also, data for San Francisco exclude Marin County.

totaled less than twenty-five million.[8] In addition, new capital invested in plant, equipment, and land continued high in 1947 in Los Angeles, though it did decrease somewhat from the 1946 peak.[9]

Thus, the period following 1937 was one which, for all six areas and for the states in which they are a part, saw vast changes in their population, their industrial pattern, and their incomes. By 1946, however, their patterns in many cases had returned to those characteristic of prewar years, but in Los Angeles the wartime changes appear to be permanent. Elsewhere, in spite of growth, the sources of employment and of income appear to be distributed among the various types of economic activity

TABLE 48

MANUFACTURING EMPLOYMENT IN SELECTED AREAS, 1930, 1940, AND 1946

Area	1930	1940	1946	Per cent change 1930–1940	Per cent change 1940–1946
Los Angeles	184,207	205,138	342,358	11.4	66.9
San Francisco	138,051	114,893	129,663	−16.8	12.8
Chicago	645,593	653,152	883,285	1.2	35.2
Detroit	420,026	409,446	470,703	−2.5	15.0
Cleveland	218,489	191,110	252,892	−12.5	32.3
Pittsburgh	293,107	245,899	311,932	−16.1	26.8

SOURCES: *United States Census* and United States Department of Commerce, *Business Establishments, Employment and Taxable Payrolls Under Old Age and Survivors Insurance Program* (Washington, 1947).

in a way which might well have existed had there been no war. Nonetheless, the impetus to expansion provided by the war must have certainly affected cyclical reactions in the areas, and the one great and seemingly permanent change, the alteration in the economy of Los Angeles, must have some important implications for future cycles.

By the end of 1939, activity in all areas began to recover from the recession which began in 1937. Only San Francisco's department store sales continued downward after 1939, and these reached the lower turning point in January, 1940. A number of factors account for this favorable turn of events. Probably most important of these was the sharp increase in investment in producers' durable goods, inventories, and net foreign investment. Liquidation of inventories approached one billion dollars in 1938, but, in 1939, additions to inventories approximated one-half billion. Construction contracts reported for thirty-seven states by the

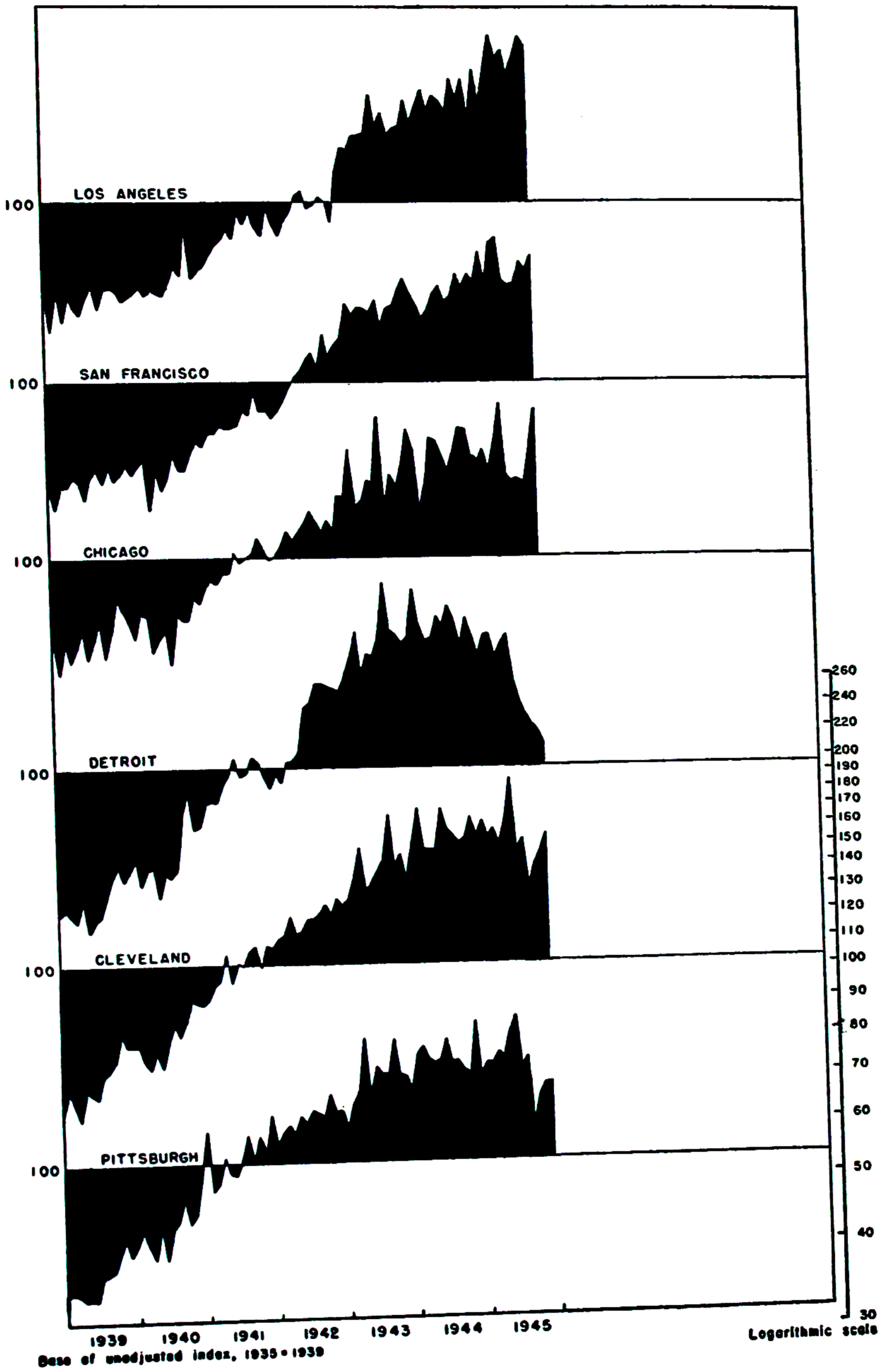
[8] Territorial Information Department, Commonwealth Edison Company, *et al.*, *Survey of Industrial Development, 1946* (Chicago, 1947).

[9] Industrial Department, Los Angeles Chamber of Commerce, *Statistical Record of Los Angeles County Industrial Development* (Los Angeles, 1948).

CHART 19

Bank Debits in Six Industrial Areas, 1939-1945

Ratio of index to 1919-1945 Trend



Base of unadjusted index, 1935-1939

F. W. Dodge Corporation doubled (from 200 to 400 million dollars) between the beginning and end of 1938.

The stimulus to this investment and to output was associated with (1), the fall and the stabilization of prices in 1938; (2), the resumption of spending and lending by the federal government which was authorized by Congress in June of that year; (3), the easing of reserve requirements of member banks; (4), falling money and bond rates; and (5), the renewed expansion of consumer credit. Yearly data in most cases provide a false impression of 1938, for the decline characterizing the first half hides the advances of the latter months, but data for 1939 show clearly that recovery was well under way. Personal consumption expenditures increased a little between 1938 and 1939, but gross private domestic investment increased nearly 50 per cent.

Even with the war's outbreak delayed until September, 1939, it was already making its effect felt in 1938, as shown by data on exports of the United States in those years. Total exports declined through 1938, but exports of metals and manufactures, except machinery, increased by 100 million dollars (nearly one third) between 1938 and 1939; chemicals, by approximately 25 per cent; and rubber, by nearly 45 per cent. On the contrary, vegetable products, animal products, and wood and paper changed little or declined.[10] These changes, however, seem nearly insignificant when compared with those of 1941 through 1944.

Bank Debits, 1939–1945

After 1937, bank debits provide comparisons by means of frequency distributions between three areas only. In Detroit, Cleveland, and Pittsburgh, peaks in debits were reached in October, 1943; July, 1944; and May, 1945, respectively. In the remaining areas, no peaks could be established with certainty before December, 1945, the end of the period for which data were processed. Chart 19, however, presents the debit series for each area from 1939 through 1945 which permits some comparison between the areas in spite of the absence of terminal peaks in the three areas.

Between the areas in which debits provide peak-to-peak cycles, there is a considerable difference in the average standing, for Detroit's adjusted debit values average 89.4, with Cleveland 95.7, and Pittsburgh 101.4. Detroit's poor showing in this respect stems from the fact that its response to the wartime stimulus was somewhat delayed. Detroit, unlike Cleveland and especially Pittsburgh, experienced a real conversion problem. In the latter areas, the war required more of an increased

[10] U. S. Department of Commerce, *Statistical Abstract of the United States, 1943* (Washington, 1944), pp. 514, 515.

output of items already produced, but in Detroit a great change in output was required.

For example, in Detroit no workers were employed in the manufacture of ordnance, guns, or tanks in 1940, and by July, 1943, of total manufacfacturing employment of 660,000, 144,000 were so employed. Aircraft production, employing a mere 3,000 in 1940, accounted for an additional 288,000 laborers. Thus, these industries, virtually nonexistent in 1940, employed more than 65 per cent of the total three years later. No such revolutionary change in Cleveland or Pittsburgh occurred. Therefore, the delay in Detroit's expansion is completely understandable. Even so, its conversion to war industry was rapid. Also, at the outset, Detroit was more depressed than the other areas and, although by late 1943 it rose somewhat above the other areas, its earlier low standing held the average down. Almost opposite circumstances serve to give Pittsburgh the highest average, whereas Cleveland, in some respects like Detroit and unlike Pittsburgh, stood between these two extremes.

The variableness of the areas, as measured by the coefficients of variation of the values between these peaks, places Cleveland as substantially more stable than either of the others, and Pittsburgh only a little more so than Detroit. This supports a proposition made earlier, and one to which there is no question, that Detroit's characteristic instability stems from its peacetime concentration in automobiles.

Close study of the series on chart 19 reveals that the two western areas, Los Angeles and San Francisco, are much alike. In only two short periods, the winter of 1942–1943 and the period following V-E Day, was there any noticeable divergence. The earlier divergence came at a period when the wartime expansion was occurring at the most rapid rate, and it can be accounted for only by the near death of nonmilitary construction and severe agricultural losses in Los Angeles, a result of heavy rains and near-freezing weather. The spread between the areas after V-E Day is simply explained; aircraft production declined less rapidly than shipbuilding, and San Francisco, concentrating in the latter, therefore experienced the most drastic decline. Both western areas continued upward through the first half of 1945, a movement not characteristic of the eastern ones. At this time, Chicago moved ahead in almost the same way as Cleveland and Detroit, but earlier, particularly in the spring of 1942, its expansion proceeded at a rate more like those of Los Angeles and San Francisco. One reason is that Chicago experienced a wartime alteration in its economy which closely resembled that of the West Coast areas. Awards for industrial facilities were greater in Chicago than in any other industrial area; total investment in facilities between 1939 and 1945 approximated one and a third billion dollars, in spite of the fact that

prewar Chicago was the largest of the industrial areas studied. Also, new investment was directed into industries that were not highly developed in Chicago previously, 450 million in transportation equipment, 175 million in ordnance, and 95 million in nonferrous metals.[11]

One final observation on the picture provided by bank debits between 1937 and 1945 deserves statement. In the face of rising prices and wages, the stabilization and decline of debits in the eastern centers must reflect some more severe downward movements in physical volumes. True, not until early 1946 did the rapid postwar inflation begin, but 1945 was a year of a continual inching upward of prices of nearly everything. The fact that western debits continued strongly upward, on the contrary, undoubtedly reflects firm or increasing volumes. Further light on this matter will be given by the other series to be examined.

Department Store Sales in the Wartime Expansion

Department store sales do not provide any complete cycles after 1937, but chart 20 presents the series for the six areas. None of these show a real downturn, though in some a lower rate of increase is observable as early as the beginning of 1943. In Los Angeles, San Francisco, Chicago, and Pittsburgh, this hesitation was followed, however, by a sharp reacceleration beginning in early 1944. The delayed effects of the wartime expansion in the western areas, obvious even in the bank debit data and commented on above, can be seen; for example, San Francisco did not begin its uninterrupted increase until the spring of 1942, whereas the eastern centers began theirs as much as a year earlier. In the fall of 1941 all areas experienced a sharp drop in sales, for inventories and commitments accumulated and federal restrictions on purchases and production expanded. By the end of the year, the declining output of many goods led to a rapid improvement in inventory position. In all the inland areas, year-end sales were as high as during the summer, but the delayed expansion of industry and pay rolls on the Coast retarded recovery to the 1941 highs until mid-1942.

A large share of the increase from 1941 onward in store sales is traceable directly to price increase. Prices of all commodities still available advanced rapidly through 1941 and 1942, but thereafter they moved upward very slowly as price controls limited advances. By early 1943, store sales reached peaks that were not surpassed until late 1944 or early 1945 except for a few months. The most rapid advances in sales (owing to both price and volume increases), however, did not come until 1946, but unfortunately this year lies beyond the period covered in this study.

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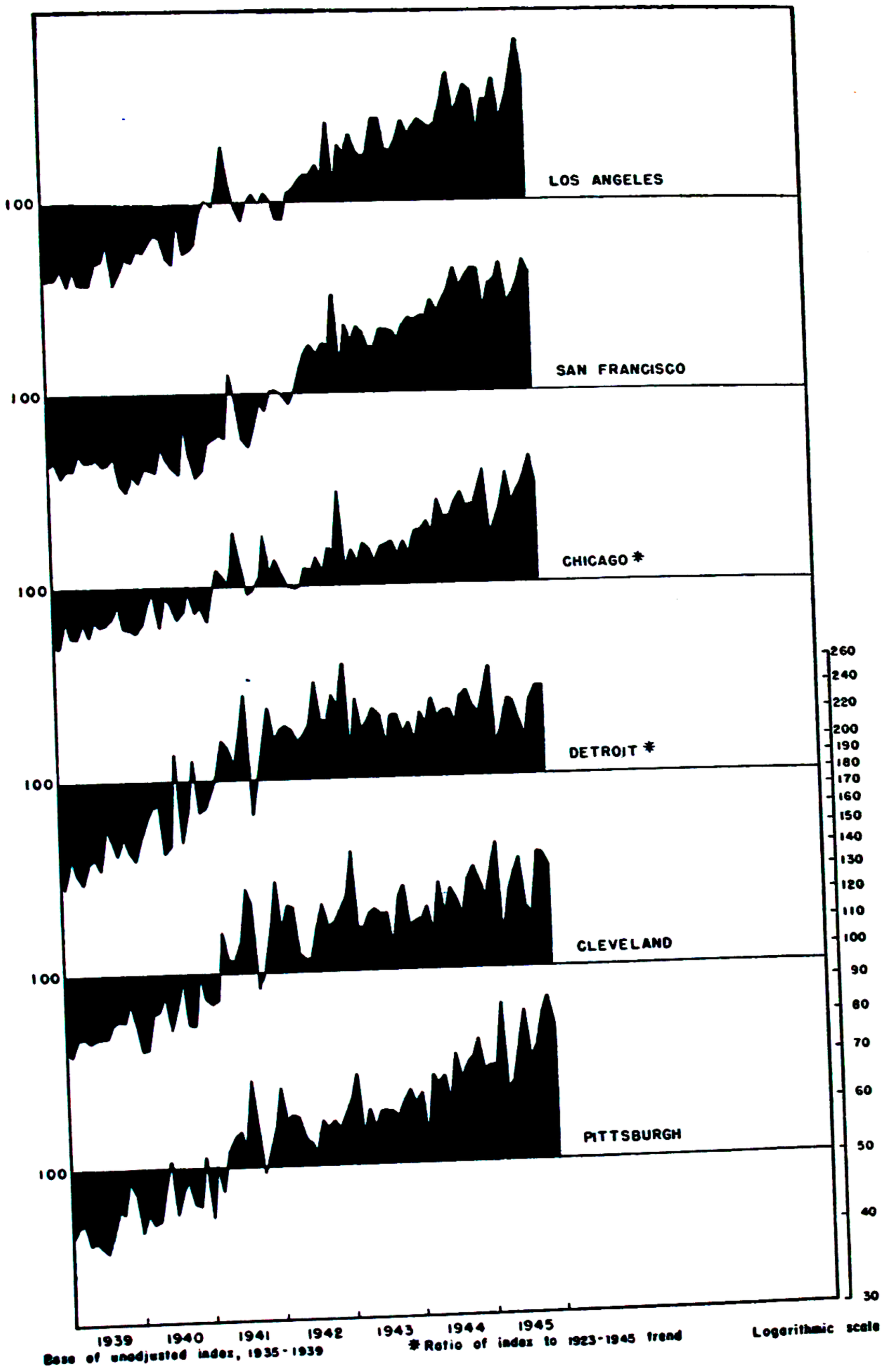
[11] Dun and Bradstreet, *Chicago* (New York, July, 1947), p. 16.

CHART 20

Department Store Sales in Six Industrial Areas, 1939-1945

Ratio of Index to 1919-1945 Trend



Base of unadjusted index, 1935-1939

* Ratio of index to 1923-1945 trend

The store sales series clearly shows the consequences of price controls, rationing, and the shortage of goods. A comparison of chart 19 with chart 20 makes this clear. Debits moved upward sharply and to higher levels than sales, and the continued growth of sales after debits began to sag in certain areas, particularly in Detroit, reflects the increased availability of durable goods and more especially of nondurables to consumers' goods markets as a result, first, of V-E Day, and later, of V-J Day.

Power Sales and Employment, Expansion and Collapse

The most vivid picture of the war's effect upon the economies of the areas appears in the remaining two series, power sales and employment. Of course, it is to be expected that in these two series the peculiarity of the wartime industrial expansion in any area would be reflected; first, in this "real" series and, second, or possibly not at all, in debits or store sales. The effects of a unique industrial growth on debits or store sales are obscured by normal civilian activities. These normal activities, such as food purchases, domestic services, and the like, make little, if any, impact on industrial employment; but they do affect the course of debits and store sales.

All six areas experienced a complete cycle in power sales between the peak of 1937 and that of 1943 or 1945. Detroit, Cleveland, and Pittsburgh began their recession in 1937; but Los Angeles, San Francisco, and Chicago had continuous expansions extending into 1945. Those areas that moved downward during the war provided either basic materials such as steel, tools, and machinery, or other goods, the requirements for which were satisfied early. Los Angeles and San Francisco specialized in goods the demand for which remained relatively high and, therefore, were sustained for a longer period. Chicago, in this case, represents the mixed economy, and study of chart 21 reveals that, though no downturn came until February, 1945, a plateau was reached there late in 1943 or early in 1944.

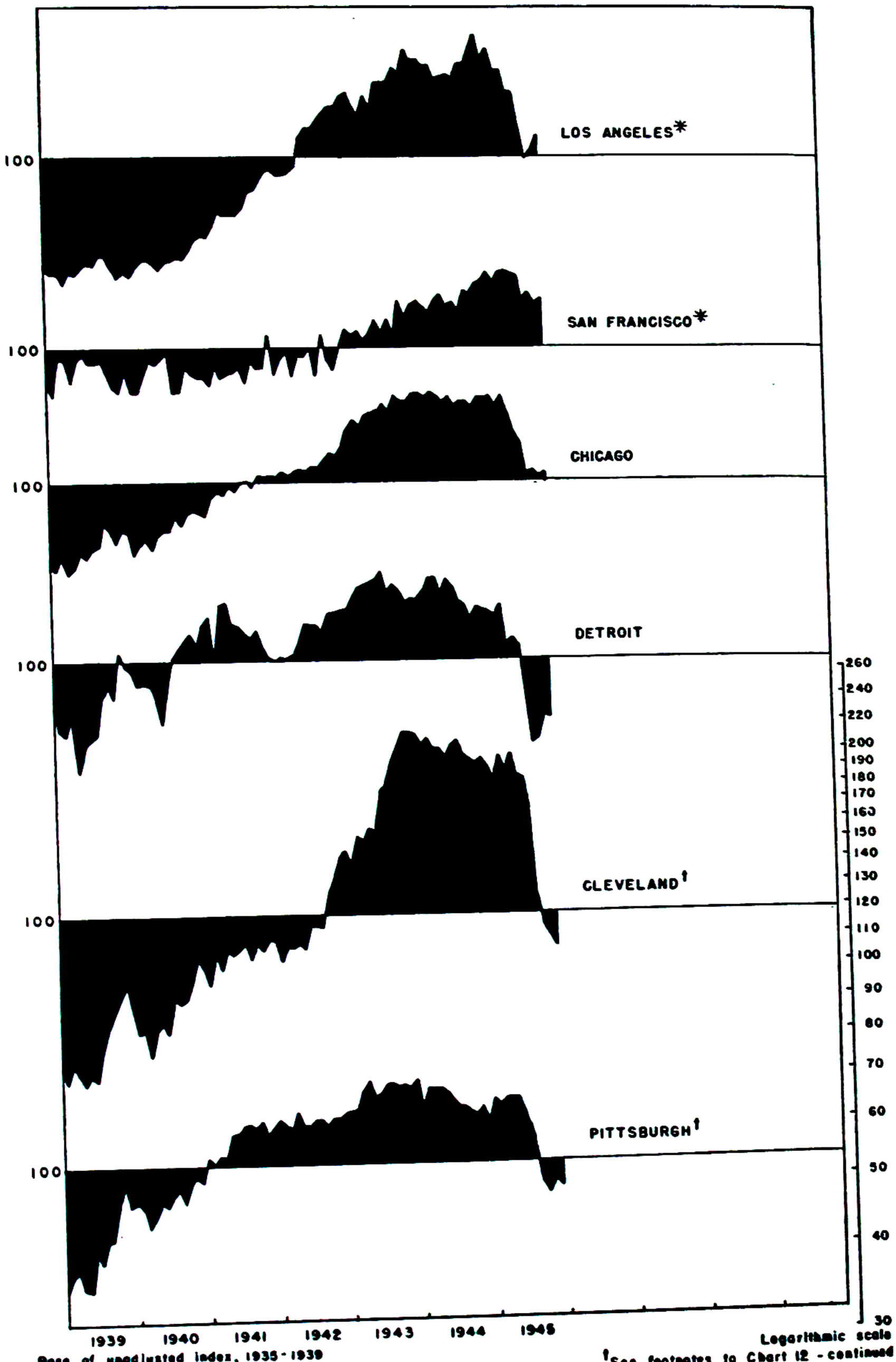
Of the six areas, only Cleveland has an average standing that is unique. The adjusted power sales values in that area average 83 per cent in the cycle, whereas in the other areas comparable figures range from 93 to 98 per cent. Cleveland's power sales values, as reference to chart 17 will show, were much more depressed in 1938 and remained at relatively low levels through 1939.[12] This fact both explains this area's low average and indicates the existence there of a relatively large excess industrial

[12] In 1940, about 17 per cent of Cleveland's labor force was still unemployed. United States Department of Labor, Bureau of Labor Statistics, *Impact of the War on the Cleveland Area* (Washington, 1944), p. 9.

CHART 21

Power Sales in Six Industrial Areas, 1939-1945

Ratio of Index to 1920-1945 Trend



Base of unadjusted index, 1935-1939

* See footnotes to Chart 12

† See footnotes to Chart 12 - continued

capacity, a favorable condition in view of the strain that soon thereafter was placed upon the nation's productive capacity.

Cleveland's very rapid power sales increase, once under way, resulted from the fact that three very large electrochemical plants were put into operation in the latter part of 1942 and 1943. These forces together become evident from the fact that its instability, as measured by the variation coefficient, is far higher than elsewhere. These coefficients (percentages) for power sales over the 1936, 1937–1943, 1945 cycle are:

Los Angeles	26.7	Detroit	20.0
San Francisco	11.7	Cleveland	35.3
Chicago	20.4	Pittsburgh	23.5

The fact that San Francisco's power sales include residential sales should again be noted. Detroit's stability is merely a product of the early expansion to full capacity and of the sustained nature of the demand for its wartime product as compared with the peacetime demand for automobiles. Chicago's stability suggests that its enormous prewar industrial output placed it in a position to absorb wartime demands upon it without particularly altering its usual stable cyclical pattern. Even in wartime, diversification apparently contributed to Chicago's relatively steady economy.

Employment, during this period, provides as interesting a picture of this wartime cycle as power sales. In Detroit, employment so follows the exigencies of defense and wartime expansion that its prewar conversion period is identifiable as a recession in employment, making Detroit noncomparable with the other areas. The means and coefficients of variation for the remaining five areas are:

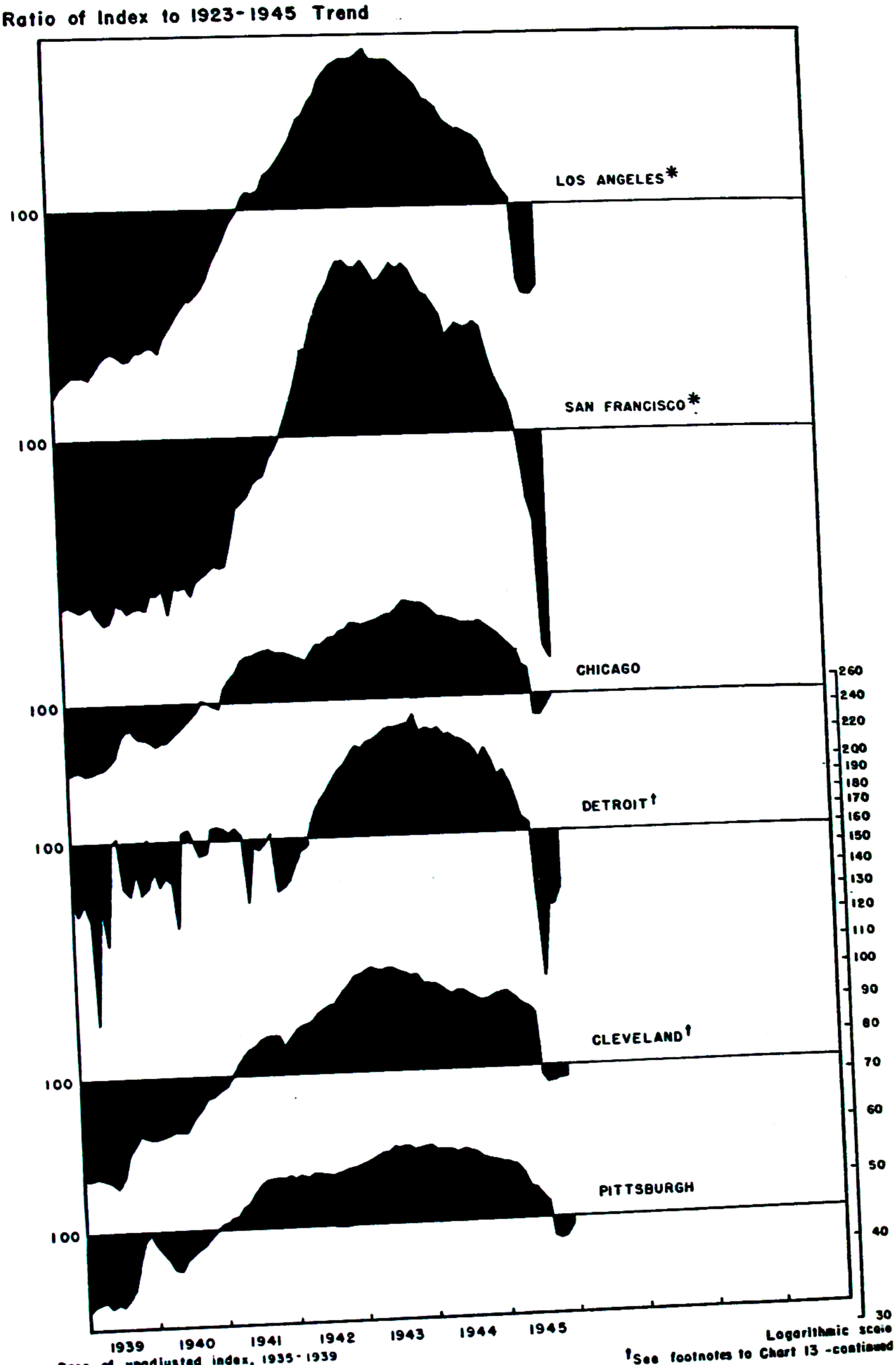
Area	Mean	Coefficient of variation (per cent)
Los Angeles	85.5	40.7
San Francisco	77.0	41.7
Chicago	100.9	18.8
Cleveland	95.7	22.5
Pittsburgh	99.1	17.4

Chart 22 shows that Pittsburgh's employment was least affected by the war and that San Francisco's was most affected. Both Los Angeles and San Francisco, least industrialized and most depressed of the six areas in the prewar period, experienced measurably larger fluctuations than the others; these areas also increased most rapidly in population. Using Cleveland as representative of the eastern centers, the order of

CHART 22

Industrial Employment in Six Industrial Areas, 1939 - 1945

Ratio of Index to 1923-1945 Trend



Base of unadjusted index, 1935-1939

* See footnote to Chart 13

† See footnotes to Chart 13 -continued

magnitude of the difference between them and Los Angeles is indicated by the differential increase in manufacturing employment between April, 1940 and November, 1943; in Cleveland it increased from 191,000 to 360,000 (88 per cent), and in Los Angeles it increased from 205,000 to 638,000 (211 per cent).[13] But this greater increase in the West did come later than in any area except Detroit; by the spring of 1941, Cleveland, Chicago, and Pittsburgh had moved up above trend and, by the end of the year, were at levels not far below wartime peaks. Neither Los Angeles nor San Francisco surpassed trend until the fall of 1941, but their rate of increase from that point was much greater than elsewhere.

By the middle of 1943, a pronounced decline in employment, which also contributed to their instability, began in these two western areas. This decrease preceded the decline in power sales by some twelve to eighteen months as noted on chart 21. It occurred in spite of continued large demand for the principal war products of these areas, aircraft in Los Angeles, and ships in San Francisco. But this decrease in employment did not signal the beginning of their conversion problem. Rather, it reflects substantial improvements in labor productivity, for output of war goods continued at record levels. In these two areas production actually held up longer than in the East, and power sales (chart 21), even in San Francisco, provide a more reliable indicator of the timing of the downturn in output than employment. In the East, on the other hand, both series present approximately the same picture.

In absolute terms manufacturing employment in the West remained far above trend until early 1945, but the conversion problems, more difficult to solve than the reconversion problems in the East, made the rate of decrease greater in the West. San Francisco's adjusted industrial employment (chart 22) declined from an index of nearly 150 to less than 50 between the autumn of 1944 and the spring of 1945, whereas the same index values in Los Angeles were 130 and 75 over the same period. In contrast, Cleveland, Chicago, and Pittsburgh reached a low point of approximately 90 in the fall of 1945 and, by the end of the year, had begun to recover.

The coefficients of variation presented above, roughly 40 per cent for the western centers and 17 to 22 per cent for eastern ones, reflect the wide difference in the impact of the war on the areas. This impact constituted a near revolution in manufacturing in the West but, in older industrial areas, it resembled more a normal cyclical prosperity.

Comparison of the four series presents in bold relief the differential

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[13] United States Department of Labor, Bureau of Labor Statistics, *A Statistical Summary of the Los Angeles Area* (Washington, December, 1943), p. 16, and *Impact of the War on the Cleveland, Ohio, Area* (Washington, 1944), p. 47.

picture of variation that series affected by price show as compared to that revealed by real or output series. In no area did department store sales decline once the expansion was under way, and in only three cases did debits slack off from wartime peaks; what is more, where debits did decline, the decrease was moderate as compared with that in power sales and especially in manufacturing employment. It is true, however, that prices were not the only influence accounting for the differential reaction of the two pairs of series, for wholesale prices did not begin their most rapid rise until after 1945. Had prices risen more rapidly through 1945, probably no debit series would have declined. The uniform increase in store sales, therefore, resulted both from price increases and the increased availability of goods. The decrease in industrial pay rolls served to weaken eastern debits, but population growth and relatively high levels of employment served to sustain debits in the West and prevented any movement parallel to the eastern recession.

Divergent movement between the series also clearly shows the peculiar nature of this wartime boom which was driven basically by war orders. In earlier cycles, manufacturing, as reflected in industrial employment, does not differ so radically from other economic activities. This was a manufacturing cycle more than anything else. Furthermore, the moderate, but continuous, growth of store sales in the face of far greater growth in the other series reflects the whole galaxy of wartime controls on production and distribution. Had these controls been unnecessary, it is certain that sales would have moved in a manner much more nearly like the other measures.

The planned nature of the expansion, with governmental decisions so important in determining the location of new facilities with publicly-financed expansion largely replacing private investment, and with a variety of controls over private investment and consumption, accentuated differences in the cycle in the six areas and differences between the series in each. Never before did San Francisco and Los Angeles appear to have measurably greater cycles, and seldom was the delayed reaction or uniqueness in cyclical pattern so marked. A normal cycle, accompanied by voluntary decisions of millions of individuals, presents a more uniform picture of the cycle, however and wherever measured.

To complete the description of this era and to treat it in the same way as earlier periods, some attention must be paid to the years 1939 through 1945, regardless of the comparableness of the cyclical turning points. Table 49 presents the standard deviation for each area and each series (adjusted for the 1939–1945 trend only). These figures again unmistakably reflect the peculiarities of our wartime economy. Debits and store sales show, however, that the normal interarea differences are not alto-

gether hidden, for Chicago's usually stable position and Detroit's unstable one are sustained somewhat. But the wide differential reaction noted in the earlier period does not appear in this period.

Usual relationships between the areas are lost in the power and employment series. Both Los Angeles and San Francisco show much wider variation in employment than the other areas; San Francisco would certainly reflect greater instability in power sales were it not for the fact that its series includes residential sales. In Los Angeles, power sales fluctuate closely with employment.

TABLE 49

THE STANDARD DEVIATION OF ADJUSTED INDEX VALUES FOR FOUR SERIES IN SIX AREAS, 1939–1945

Series	Los Angeles	San Francisco	Chicago	Detroit	Cleveland	Pittsburgh
Bank debits.....	11.7	8.9	8.5	12.8	7.8	8.4
Department store sales.....	7.6	9.3	6.5	9.7	9.2	7.3
Power sales.....	26.7	7.0	8.3	12.0	16.9	11.0
Employment.....	22.2	27.0	11.0	16.6	11.8	10.5

SOURCE: Derived from data in appendix ii. Data are adjusted for 1939–1945 trend only.

Another striking difference between this period and others is the comparative stability of Detroit. Although, in most cases, its variation exceeds that of its neighbors, the differential between 1939 and 1945 was not great. Only in power sales is Detroit's instability actually less than the remaining three, and this is due partly to Cleveland's extraordinarily depressed prewar sales and to its very high wartime sales caused largely by sales to the new electrochemical plants.

CONCLUSIONS

In the description of this period, emphasis has been placed upon the unique causes for expansion that were at work, and upon the differential effects of these forces upon the six areas studied. A final warning should be made, however, against viewing this period as different from others in all respects. Such an emphasis represents a failure to recognize that, although the wartime controls were probably more far-reaching than those we will ever face in peacetime, fundamental changes have long been under way in the prevailing philosophy of the economic responsibilities of government. Cyclical variation will more than likely hereafter be associated with a growing network of government activities, all designed to preclude inflationary spirals and crises and the deflation and

liquidation of recession. This being so, future fluctuations may be accompanied by governmental activities that will make area cycles more like those of the late 'thirties and 'forties than the cycles of an earlier era.

Also, the differences between the areas and the series in this wartime period may be somewhat exaggerated. As astonishing as the differences appear to be, their resemblance to earlier peacetime fluctuations is, perhaps, even more surprising. Even with nearly every phase of economic life subject to government regulation, certain facts regarding cyclical pattern still prevail. Detroit is less stable than most areas, Chicago is more stable, and the others lying between these extremes are very similar. It is true that many of the prewar relationships between regional cyclical patterns were distorted or obscured, but these distortions were not at all general. In this effort by the government to boost employment and output to the highest possible levels, a cyclical pattern and a picture of instability were revealed that bear a very close relationship to other cycles. Government intervention, regardless of its magnitude, does not seem to bury completely the forces at work in a normal peacetime civilian economy.

Chapter VIII

CONCLUSIONS

UNDERLYING this entire study is the thesis that business cycles, or business fluctuations, involve more than movements in aggregate economic activity, and more than movements in the various industries or businesses that make up our economy. They are extremely complex phenomena and cannot be accurately described by any single index of business conditions. There are variances between cycles in different industries and between cycles in different areas. The use of a single national series as an index of business cycles involves either the assumption that local divergent reactions are unimportant or that they do not exist. It is probable that the smaller the area concerned, the less important is the cycle (except for those few who live there); on the contrary, larger areas are larger markets and sources of goods and services. Hence, they are more important because they are more likely to influence other areas. However, it cannot be assumed that either very small or very large areas will behave as the nation as a whole does, or that larger ones, representing proportionately greater portions of the total, are less likely to experience unique or unusual variations. The study of business cycles must include not only the examination of variations between many measures of national cycles, but also the examination of measures which will reveal peculiarities of local business fluctuations.

Forces affecting regional business conditions may be classified in several groups. First, there are those that tend to act in an approximately uniform manner upon all parts of the nation and upon all segments of the economy. Among these are such factors as changes in consumer saving and spending patterns, changed business psychology concerning investment, and the like. But other more specific forces such as federal fiscal and monetary policy, tax policy, exchange rates and control, and basic technological changes also fall in this group.

Second, there are the nation-wide forces that normally react more strongly upon certain regions than upon others. This differential reaction may be due either to the nature of the stimulus or to the character of the economy of the region involved. The best examples of this type of nation-wide forces were those at work during the war effort. The impact of the war on Pittsburgh was decidedly different from that on Los Angeles. In the former, government requirements strained existing capacity; in the latter, it led to the creation of new capacity. Another example is the impact of the Fair Labor Standards Act; its consequences depended greatly on wage levels in various sections and, therefore, affected some

areas more than others. Most frequently, reactions peculiar to a smaller area result from the character of its economy. Emphasis on certain types of activity (e.g., transportation equipment in Detroit, or more generally, durable producers' goods in Cleveland or Pittsburgh) may provide the basis for specific local reaction.

Third, there are forces originating within restricted areas, the consequences of which are transmitted to others. The best example in the period covered by the data in this study is the impact of retooling in the automobile industry in Detroit in 1927. Unquestionably, at other times similar forces contribute importantly to movements in business activity, but their impact is lost when combined with other stimuli. Varied agricultural output, security market crises, and many other factors which may be classified as erratic fall in this third group of forces.

Finally, some forces operate primarily within particular areas, affecting their own regions most significantly and influencing others so slightly or so indirectly that their effects cannot be precisely traced. The principal example of this type is the influence of population growth or decline on a particular area and the attendant altered conditions in such localized activities as residential building and local personal services.

These forces, when combined, may lead sometimes to similar cyclical movements in all areas and at other times to wide regional divergence. The relative strength of the forces making for convergence, as opposed to those making for divergence, determines the effect of a particular local stimulus. It seems reasonable to suppose that the nation-wide forces are relatively greater factors in major cycles than in minor ones, but in no case are the consequences of more localized forces entirely absent.

The areas whose cycles have been examined in this investigation differ significantly from one another, and the most marked differences exist between the western and the eastern centers. These industrial areas are not alike either in the relative importance in each of the broader classifications of economic activity or in manufacturing pattern. Some have rapidly growing population and industry; others appear to be retrogressing in these respects. The single characteristic common to all is that they are very large industrial centers. The underlying questions concerning the areas examined in this study can be worded as follows:

1) Do the areas studied have similar or different cycles?
2) If different, which peculiar characteristics or factors are responsible?
3) If similar, why are the forces making for divergence relatively weak?
4) Are any changes occurring in the areas that may materially affect the future cyclical movements?

A few generalized, and many specific, conclusions may be drawn from the material presented on the timing of cycles in the areas. First, there

is absolutely no support for any thesis that cycles move regularly from east to west. Although certain industries may be affected earlier than others and, hence, areas in which these industries are important may react more promptly, this does not reflect itself in an earlier cyclical movement in any of the six areas studied. Probably this failure is due to the fact that all of the areas are large, and, except for Detroit, none seem to be so specialized that a single industry regularly determines the timing of general business fluctuations.

Second, there seems to be a tendency for divergences in timing to be less after 1929 than before that year. This, however, probably does not mean that henceforth there will be greater uniformity; instead, the minor character of the cycles in the 'twenties as opposed to those after 1929 is more than likely the cause for this apparent tendency toward diversity in the timing of regional cycles. Thus, the greater the cycle, the more likely is the conjuncture of peaks and of troughs. Only with small fluctuations may wide differences in peak and trough dates be anticipated, and, even then, the same distribution of the areas from earliest to latest may not be expected in each.

Third, of the measures utilized, only the bank debits series leads in any consistent manner. It tends to lead other series in those areas where financial transactions are important and in cycles in which security speculation is a significant factor. Thus, Chicago's and San Francisco's debit series often lead the other series used to measure business changes.

Fourth, so far as employment alone provides a measure of timing, Cleveland and Detroit (especially the latter) appear to lead the other areas, and the employment series of each moves downward and upward in advance of the other series used. This conclusion supports the evidence of others that durable goods production tends to lead in cycles of business change. It also suggests that in these areas regional characteristics are sufficient to make fluctuations occur somewhat earlier than elsewhere. This conclusion, however, must be looked upon as tentative, for additional data must be examined in order that an entirely defensible decision be made on this matter.

The study of the several series to determine whether or not variations in duration characterize fluctuations in different areas reveals both that these variations exist and that they do not present any predictable regular pattern. No area regularly has the longest or the shortest duration. The only exception to this irregularity is in connection with the relationship between department store sales series in each area and the other series. The store sales series seems always to have longer fluctuations than other series, primarily as a consequence of more protracted recessions. This characteristic of store sales illustrates well the belief

that individuals offer substantial resistance to reduced levels of consumption in periods of declining income. In other words, the relation between consumption and income is different if income is falling than if it is rising.[1] This rigidity of consumption was sufficient even to obliterate several of the minor cycles in the 1920 decade.

Specialization in manufacturing generally does not appear to guarantee anything with respect to duration, but this is not surprising in view of the failure of such specialization regularly to alter timing. Nor does particular specialization in any manufacturing industry seem to cause either especially long or especially short cycles. The causes of cycles are too diverse to permit manufacturing patterns to reflect themselves faithfully in associated cyclical durations. A possible exception to this conclusion, or, with more precise data and more observations, even a refutation of it, may be based upon some evidence that Pittsburgh's cycles appear to be a little shorter than others. This area's performance is not uniform enough in this respect to justify, at this point, a conclusion contrary to that expressed above, but the possibility of an opposite result should be noted. More complete data might show shorter cycles in what might be called "manufactured raw materials" areas.

That manufacturing activities affect cycles in some degree, however, is evidenced by the fact that differences between the durations reflected by the four series are least in Cleveland and Pittsburgh. Although manufacturing does not prove to be a cause of divergent duration between areas, it does so color other activities that measures reflecting changes not only in manufacturing but in all segments of the economy reflect similar length cycles.

Finally, growth does not seem to affect, to any important extent, the duration of cycles. Regardless of the method employed in measurement, high rates of growth do not guarantee either unusually long or unusually short cycles. If growth were important, both Detroit and Los Angeles, as extremely rapidly growing areas, should experience cycles of measurably different lengths from the other areas, but this is not true. Nor does a decline in rate of growth seem to affect the length of cycles, for neither Chicago, Cleveland, nor Pittsburgh appear to have extraordinarily short or long cycles on this account.

The four sets of factors described above yield cycles in the areas which are sometimes very much alike and at other times altogether different. All areas seem to experience similar fluctuations whenever prices are unstable, but when fluctuations fail to be reflected in price movement,

[1] Cf. Paul A. Samuelson, "Full Employment after the War," *Postwar Economic Problems* (New York, 1943), S. E. Harris, ed., p. 34; and G. Myrdal, *Monetary Equilibrium* (London, 1939), pp. 164–166.

the conformance of the areas lessens substantially. Thus, a basic element in the definition of "national" cycles must be price variability. A vulnerable price structure must be considered as a danger signal in all areas, regardless of geographic location, size, rate of growth, or industrial characteristics.

In spite of the importance of price changes as a factor tying areas together, it is important to note that they do not seem to be associated with cycles in the manner traditionally believed. Upper turning points are by no means always preceded by rapidly rising prices, nor are the troughs always associated with periods of price stability. At times price increase has occurred long before output has ceased to rise, and in periods which otherwise appear to be stable; also, price decrease has accompanied other changes that signify improving business conditions. Thus, though price instability is essential to national cycles, any single area cannot overlook the possibility that it will experience a significant change in business conditions, even in the face of steady prices. Neither is the coming of an alteration in national conditions always heralded by price change, even though it will surely be tied to price movement as the process of expansion or contraction continues.

The relative amplitude of area cycles cannot be foreseen from knowledge of the industrial pattern of the area involved, of its resource base, of the region it serves, or of its rate of growth or decline. Simple rules for prejudging cyclical variation are not possible because the factors conditioning cyclical response are too diverse. Pittsburgh, relatively constant in size and in concentration in producers' durable goods, does not generally have abnormally severe cyclical swings. Los Angeles, growing rapidly, and like Chicago in its diversity, failed to show evidence of comparative stability and resembled Pittsburgh in its response to cycles more than any other area. Cleveland likewise differs from Los Angeles in nearly every respect except the intensity of its business cycles. Only in Detroit did industrial pattern invariably reflect itself in measurably different cycles, and here the influence of its one great industry, automobiles, is sufficient to affect noticeably not only the real series but also debits and store sales. Economic life in Detroit may be said to be dominated in all phases by this industry. The extent of this dominance even extends to the point that debits, elsewhere always least stable of the series, is more stable than employment.

At times, the importance of certain characteristics of each economy makes itself apparent in one or another of the series. Best exemplifying this is the tendency for debits in financial centers to show extreme fluctuations in periods of financial crisis. Chicago and San Francisco, as capital markets, tend to have relatively unstable debits, but the sig-

nificance of financial activities in each never extends to the other measures of cyclical response.

In summary, only Detroit shows a measurably less stable cyclical pattern than the others. Almost regardless of the method of measurement, this seems to be true. There is possibly a little justification for holding that, in general, both Chicago and San Francisco have some measure of cyclical stability, but this is by no means always true, and may be more illusory than real. Among the three remaining areas, Los Angeles, Cleveland, and Pittsburgh, the differences in the amplitude of business fluctuations are, in general, too small to be considered significant.

The events of recent years, the war and its aftermath, have done little to alter the cyclical patterns in the areas permanently. In spite of an unprecedented spurt in the role of government, as regulator, financier, and buyer, the usual interarea differences are not completely hidden. Detroit's unusual instability seems still apparent, and Chicago's slight stability still discernible. The war did usher in a greater divergence among cycles in debits, store sales, employment, and power sales, and probably did hasten the development of manufacturing in the West, particularly in Los Angeles. It is doubtful if the former will continue, and even more doubtful if the latter will be of significance in shaping the course of future cyclical reaction.

Though business cycles may be the final result of a few basic causes, or possibly only one, the multiplicity of differences that appear in the study of regional cycles indicates that important forces intervene to yield significantly different cycles in individual areas. The forces responsible for divergent reaction are many sometimes yielding a result easily explainable in terms of conditions existing in the several economies, but as often they yield results not nearly so simply interpreted. These forces react differently in different periods so that their consequences are not logically arranged and so that their results defy forecast. The study of cycles, heretofore principally confined to abstract analysis, and always within both a specific time and industry reference, must be expanded. Though contributing enormously to the complexity of the problem, and perhaps indefinitely postponing the day when all significant causes are uncovered and understood, a recognition of the necessity for a specific spatial reference will lead ultimately to a sounder knowledge of causes and, therefore, to sounder private and public corrective policies.

APPENDIX I

APPENDIX I

SOURCE AND COVERAGE OF THE PRINCIPAL TIME SERIES

DEPARTMENT STORE SALES SERIES

THE SERIES used are published by the Board of Governors of the Federal Reserve System and are collected by the individual Reserve Banks. They represent sales by department stores in the major city, or cities,[1] of the industrial area and, hence, provide an index of changes of store sales in the area, even though not representing the area as such. The index prepared by the Reserve Board covers 70 per cent of total department store sales in the country, though only a third of all stores report. Checks against the census indicate that errors resulting from inadequate coverage are small, even so far as local sales are concerned.[2] The data are published in two forms: one is unadjusted for seasonal variation, whereas the other is adjusted. Both are corrected for differences in the number of trading days and for the changing date of Easter.[3] In these respects this series differs from the others used in this study. The series unadjusted for seasonal variation, however, were used as the basic data because of the wish to correct all series utilized herein by the same method.

COMMERCIAL AND INDUSTRIAL POWER SALES

The Chicago series represents indexes of "Large Power Sales" in the Chicago area (6,000 square miles in northern Illinois and, hence, not the same as the area defined by the census) which covers fairly well all industrial and commercial power use.[4] The Cleveland series actually is "Commercial and Industrial Power Sales" but refers to the Cleveland Metropolitan District, an area somewhat smaller than the industrial area; it nevertheless includes the city of Cleveland plus its environs, where population density exceeds 150 persons per square mile.[5] These two series provide the widest coverage. The power sales series for Detroit and Pittsburgh represent industrial power sales only and, therefore, may present a somewhat sharper picture of cyclical variation. This factor

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[1] The San Francisco index, for example, includes the cities of San Francisco, Oakland, and Berkeley.

[2] Board of Governors of the Federal Reserve System, "Revised Index of Department Store Sales" (reprinted from *Federal Reserve Bulletin*, June, 1944), p. 3.

[3] For method of adjustment, see Board of Governors of the Federal Reserve System, *op. cit.*, pp. 5–7.

[4] This series was made available by the Commonwealth Edison Company of Chicago and the Northern Illinois Public Service Corporation.

[5] The source of these data is the Cleveland Electric Illuminating Company. The service area of that company expanded somewhat between 1926 and 1928 so that growth of the series in those years is slightly abnormal.

must be considered when comparisons between the areas are presented at a later stage. The Pittsburgh series was prepared by the Bureau of Business Research of the University of Pittsburgh and covers most of western Pennsylvania rather than the Pittsburgh area alone.[6] The Detroit power sales data have been built up from two series, one representing industrial power consumption in the Detroit area as such, prepared by the Detroit Board of Commerce for the years 1928 to date, and the other, made available by the Detroit Edison Company of sales to their own industrial customers from 1920 to 1939. These series were linked, and the latter series adjusted upward to compensate for its narrower coverage.[7]

The power sales series in the San Francisco area provides the least satisfactory comparison with the other areas because it covers all classes of services, excluding sales for street lighting, street railway, and resale; it refers to the city and county of San Francisco plus a very minor section of San Mateo County included in the city of South San Francisco.[8] Thus, it is more inclusive in coverage than the other areas' series but is very limited geographically. The fact that sales for residential lighting are reflected in the index may make it sometimes more stable and at other times more unstable than it would be were industrial or industrial and commercial sales alone represented.[9] However, since residential sales represent approximately a fourth of total commercial sales, it is unlikely that a series including both would often move inversely with commercial sales alone. Then, although comparisons between San Francisco and the

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[6] Cf. Bureau of Business Research, University of Pittsburgh, *Industrial Databook for the Pittsburgh District* (Pittsburgh, 1936), p. 97. For more recent data, see *Pittsburgh Business Review* published monthly by the Bureau of Business Research. The specific area covered by the index includes the following counties: Allegheny, Armstrong, Beaver, Butler, Clarion (lower half), Fayette, Greene, Lawrence, Mercer, Washington, and Westmoreland. The industrial area includes only Allegheny, Beaver, Washington, and Westmoreland counties.

[7] The Detroit Edison Company data exclude consumption by the Ford Motor Company and the Dodge Division of Chrysler. Therefore, they are consistently lower than the Board of Commerce series. The movements of the two series, in the years they overlap (1928–1930), are very similar (the correlation coefficient is 0.88) so that the adjustment upward on the early series, on the basis of the regression line in the overlapping years, is justified. The formula for the regression line is $Y = 4.574 + 0.970x$, where x = monthly values of the Board of Commerce index.

[8] The series was provided by the Research Department of the San Francisco Chamber of Commerce. It includes sales by the Pacific Gas and Electric Company since 1936, and before that time it includes sales by that company plus those of the Great Western Power Company. The latter organization was absorbed by the Pacific Gas and Electric Company as of April 1, 1936.

[9] Between 1929 and 1933, total domestic sales in the United States actually increased, whereas sales to commercial users declined drastically. Thus, if San Francisco represents well the nation, the inclusion of domestic sales should cushion the decline between 1929 and 1933 in that area. Contrarily, the increase in United States domestic sales between 1933 and 1937 was greater than in commercial sales. Again, if San Francisco's sales are similar to the nation's, the included domestic sales should destabilize the power sales series in that area. Cf. J. M. Gould, *Output and Productivity in the Electric and Gas Utilities, 1899–1942* (New York, National Bureau of Economic Research, 1946), pp. 40–41.

other areas of the amplitude and pattern of cycles are not particularly meaningful, comparisons of turning point dates are.[10]

The geographic coverage of the San Francisco series, because of its other important shortcomings, is not a matter for great concern. The omission of counties other than San Francisco further limits the suitability for comparison of the series, especially in later years when other sections of the industrial area experienced rapid development. Great care must, therefore, be exercised whenever the San Francisco index of power sales is utilized.

The power sales index in Los Angeles represents industrial power sales only. The series, provided by the Research Department of the Security First National Bank of Los Angeles, covers a large area in southern California. It is considerably more than the industrial area itself, since parts of Kern, Santa Barbara, Orange, and San Bernardino counties as well as Los Angeles County are included.[11] However, since the series excludes electricity sales for agriculture and oil pumping, and because industry in areas outside Los Angeles County is comparatively slight in importance, the series reflects well fluctuations in power sales in the area itself.

Employment Series

The employment series used for the Los Angeles and San Francisco areas are derived from data prepared by the Division of Labor Statistics and Research, Department of Industrial Relations, State of California, and by its predecessor agencies. The 1935–1946 series in each case were adjusted to the *Census of Manufactures* by that agency. The figures for the earlier years were collected by the Division of Labor Statistics and Law Enforcement of the Department of Industrial Relations and published in the *California Labor Statistics Bulletin*. The earlier data (1925–1935) had not been adjusted to the census and were believed by the Division of Labor Statistics and Research to have "a good deal of downward bias," though satisfactory as an index of month-to-month changes.[12] Therefore, in the present study, the 1925–1935 series were

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[10] Data for San Francisco are not available to prove this point, but data for the nation are. Not once between 1926 and 1942 did yearly domestic and commercial sales for the nation move inversely with commercial sales only. See Gould, *op. cit.*, table 11.

[11] The series represents the sum of sales by the Los Angeles Bureau of Power and Light, Department of Water and Power and the Southern California Edison Company, Ltd., since February, 1937. Before that date, the power sales of the Los Angeles Gas and Electric Corporation, since absorbed by the Department of Water and Power, were added in. The series of power sales for Los Angeles is short, being available only since 1927. A changed definition of "industrial power sales" made in 1926 makes all earlier data noncomparable.

[12] The 1925–1935 data in San Francisco originally referred to the city rather than to the industrial area. Because the city employed 67 per cent of total manufacturing wage earners in the area as early as 1925, it is assumed that the index, when adjusted upward to correct for the downward bias, reflects employment changes in the county as well as in the city.

adjusted to the census.[13] The two series reflect changes in "Production and Related Workers," a definition formulated by the Division of Statistical Standards, United States Bureau of the Budget. Before that time, the census category "wage earners" was the object of the indexes. This change is not believed to have an appreciable effect on the indexes, however.[14]

The employment series utilized in the Chicago area is prepared by the Illinois State Department of Labor and is an index of wage earners in manufacturing in the city of Chicago. The series, thus, is comparable in components with those of western areas though it covers the city rather than the industrial area. It is probable that it represents well the monthly changes in the area itself since, in 1939, 71 per cent of the area's wage earners were to be found within the city. The fact that such a large manufacturing center as Gary, Indiana, lies within the Chicago industrial area makes it possible that at certain times the index will fail to reflect faithfully changes in the area's employment. Whenever manufacturing employment in Chicago shows peculiar characteristics, it will be necessary to consider the possibility that noncity changes are the underlying cause.

The changes in industrial employment in the Detroit area are measured by an index of "industrial employment" prepared by the Detroit Board of Commerce. This index is derived from a sixty-firm sample and covers roughly Wayne County. The area is, therefore, somewhat smaller than the industrial area as such, though Wayne County in 1940 employed approximately 90 per cent of all workers in the area. The index measures employment of all hourly-rated factory employees rather than wage earners alone. This may tend to stabilize somewhat the series over one reflecting production workers only, but it is somewhat doubtful if this matter is of sufficient significance to justify the use of any correction factor.

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[13] The bias results from the fact that the indexes were constructed from an "identical firm" sample. Thus, the effects of new firms were ignored. The steps in the adjustment were:

a) The yearly averages of the series in odd years and the census actuals were converted to indexes with 1935 = 100 and differences computed.
b) Percentage changes required to make the index of yearly averages equal to the index of census actuals were computed.
c) The yearly averages of the intercensal years were adjusted by the mean of the differences in the adjacent census years.
d) The monthly values in each year were adjusted by the same factor as the yearly averages.
e) A three months' moving average was run over the Los Angeles series to smooth discontinuities resulting from this step-wise adjustment. In San Francisco the step between December and January resulting from the adjustment was spread over the four months, November to February.
f) The adjusted 1925–1935 series was linked to the 1933–1945 series by a similar method. All values in the 1925–1935 adjusted series were corrected by the percentage difference between their 1935 yearly average (100) and the yearly average of the later series (which was on a 1940 base).
g) The entire series, 1925–1945, was placed on a 1935–1939 base.

[14] Cf. Department of Industrial Relations, Statistics of California, Division of Labor Statistics and Research, *California Labor Statistics Bulletin*, January, 1945, p. 2.

The Cleveland employment series, prepared and published by the Cleveland Chamber of Commerce, is an index of total employment (as distinguished from wage earners alone) in "100 large and representative manufacturing establishments and utilities located throughout Cuyahoga County." It is, therefore, restricted to a section, though a large one, of the industrial area as defined by the census; the census area includes also Lorain County. Cuyahoga County accounts for approximately 90 per cent of the manufacturing in the *area*, and, since the industry of Lorain is approximately the same, it is very probable that the index reflects adequately the employment changes in the area as a whole.

The inclusion of utility employment, as well as non-wage earner manufacturing employment, may tend slightly to dampen or reduce fluctuations over what they would be were the index restricted to manufacturing wage earners alone. Nevertheless, with this possible shortcoming in mind, the index is reasonably comparable with those in the other areas.

Employment in the Pittsburgh District is measured by an index of employment in manufacturing covering most of western Pennsylvania. In addition to the counties included in the Pittsburgh industrial area (Allegheny, Beaver, Washington, and Westmoreland), the district covers Armstrong, Butler, the lower half of Clarion, Fayette, Greene, Lawrence, Mercer, and Washington counties. The overwhelming importance of the Pittsburgh area, together with the striking similarity in economic pattern of the area itself and the district,[15] makes the index satisfactory as a measure of monthly changes in employment in the area.

The index utilized in this study is made up of two series published by the Bureau of Business Research of the University of Pittsburgh. The first, covering the 1923–1929 period, was constructed by a "Private Agency"; the second, the data for later years, were collected by the Bureau itself. Both series are available for several overlapping years, and it appears that the linked series are comparable.[16] The linking operation involved merely spreading over four months the difference between the change from December, 1928 and January, 1929 in the "Private Agency" series and the Bureau series. This method was deemed satisfactory in view of the very close correspondence of the two series in overlapping years.

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[15] Cf. University of Pittsburgh, *Industrial Databook*, p. 15.

[16] Cf. E. N. Montague, "Fluctuations in Manufacturing Employment in the Pittsburgh District and in the Nation—January, 1923 to April, 1932," *Pittsburgh Business Review*, May 28, 1932, pp. 14–16.

APPENDIX II

Unadjusted and Adjusted Indexes in Four Series in the Six Areas and in the United States

Bank Debits, Los Angeles

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	31.6	29.5	33.3	33.3	35.7	34.8	40.8	38.9	41.0	43.8	44.8	52.1
1920.....	54.3	47.5	57.3	52.0	48.8	53.2	56.3	50.3	51.5	52.9	54.2	62.0
1921.....	56.1	46.4	58.9	53.0	49.8	53.9	51.9	53.0	51.8	57.8	59.1	65.7
1922.....	62.4	53.3	63.6	57.7	64.2	63.3	60.9	60.3	63.1	67.1	65.3	77.2
1923.....	80.5	71.6	91.4	82.2	87.2	86.3	86.3	82.1	81.6	94.0	88.2	96.4
1924.....	97.5	96.5	105.8	92.0	89.4	85.5	85.9	81.4	79.4	91.3	86.4	97.8
1925.....	99.9	91.0	101.6	95.0	92.6	96.1	95.1	89.7	92.8	98.0	95.4	107.5
1926.....	108.0	102.9	119.0	105.5	97.0	105.4	112.0	99.8	104.0	108.0	101.5	115.8
1927.....	118.2	112.4	133.8	116.5	107.7	107.6	106.9	102.0	104.9	113.4	117.2	126.5
1928.....	121.7	118.5	140.6	133.5	142.2	140.8	115.3	117.4	124.9	141.6	137.0	142.9
1929.....	154.9	142.4	166.7	147.2	151.3	139.9	139.9	150.8	140.4	165.1	151.0	134.5
1930.....	135.3	118.3	132.8	131.8	133.4	125.1	123.3	114.3	110.4	125.0	97.7	117.1
1931.....	122.5	91.6	105.0	106.0	98.5	93.4	92.3	87.5	85.6	89.0	75.5	86.9
1932.....	84.6	70.9	73.2	74.7	62.4	64.8	64.5	61.6	61.7	60.3	57.3	65.0
1933.....	62.0	59.6	50.6	56.6	58.9	64.7	73.1	61.3	60.5	61.9	56.5	67.5
1934.....	66.6	61.8	70.9	66.5	63.6	67.3	65.7	62.8	59.7	66.4	62.0	78.7
1935.....	75.6	69.3	79.5	81.0	82.1	79.6	85.4	82.3	74.6	85.8	84.1	99.9
1936.....	101.9	88.2	96.4	105.1	99.0	105.8	108.0	98.3	98.8	113.7	103.1	129.0
1937.....	120.6	110.0	128.2	120.9	110.3	110.7	115.2	103.5	101.7	110.4	99.9	120.4
1938.....	105.4	92.3	99.7	96.4	91.5	99.9	107.0	97.1	92.5	98.3	96.1	120.3
1939.....	107.5	92.4	106.1	96.6	101.1	100.4	98.9	99.7	101.2	101.6	100.9	119.0
1940.....	113.7	105.7	108.6	109.3	108.1	108.5	111.1	105.2	101.8	113.3	111.7	127.5
1941.....	145.2	117.4	121.8	123.6	124.0	131.5	135.2	133.6	126.2	145.3	132.9	162.4
1942.....	148.8	139.0	154.1	146.0	136.0	147.0	152.8	153.4	151.9	153.5	145.9	174.5
1943.....	165.8	149.4	179.8	192.5	185.8	199.7	202.3	194.3	214.2	207.7	203.1	221.9
1944.....	217.9	211.3	234.3	216.2	221.6	239.0	226.9	226.1	217.2	223.3	233.3	258.4
1945.....	263.3	225.7	265.3	237.3	260.8	295.6	276.6	270.5	244.0	273.0	276.5	314.9

Bank Debits, Los Angeles
(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	60.7	62.3	59.5	66.1	72.0	69.4	81.7	81.7	84.6	83.9	87.3	92.4
1920.....	95.3	91.6	93.6	94.4	90.3	97.4	103.5	96.9	97.8	93.0	97.2	101.2
1921.....	90.6	82.6	88.7	88.9	85.1	91.3	88.3	94.5	91.8	94.2	98.2	99.4
1922.....	93.5	87.9	88.9	89.9	102.0	99.5	96.2	100.1	103.0	101.7	101.0	110.0
1923.....	112.4	110.2	119.3	119.4	129.2	126.7	127.4	127.3	124.6	133.4	127.7	127.1
1924.....	127.6	139.1	129.4	125.3	124.3	117.8	119.0	118.5	113.8	121.7	117.5	121.3
1925.....	122.9	123.3	116.8	121.8	121.1	124.7	124.1	122.9	125.4	123.2	122.4	125.7
1926.....	125.4	131.7	129.3	127.7	119.9	129.2	138.3	129.3	132.9	128.3	123.1	128.1
1927.....	129.9	136.2	137.6	133.6	126.2	125.0	125.1	125.4	127.1	127.9	134.9	132.8
1928.....	126.9	136.4	137.3	145.4	158.2	155.4	128.2	137.2	144.0	151.9	150.1	142.8
1929.....	153.8	155.9	155.1	152.7	160.4	147.2	148.2	168.0	154.3	169.8	157.7	128.2
1930.....	130.1	118.1	130.4	129.1	135.6	123.3	120.6	116.9	115.5	122.7	101.8	103.8
1931.....	112.6	87.4	98.6	99.9	95.7	88.1	86.4	85.7	85.8	83.6	75.3	73.7
1932.....	74.4	64.8	65.8	67.5	58.2	58.6	57.8	57.9	59.2	54.4	54.8	52.9
1933.....	52.4	52.3	43.7	49.1	52.7	56.1	63.0	55.3	55.8	53.6	51.9	52.8
1934.....	54.1	52.2	58.8	55.5	54.7	56.1	54.5	54.5	52.9	55.3	54.9	59.2
1935.....	59.1	56.2	63.5	65.1	68.1	64.0	68.1	68.8	63.8	68.9	71.7	72.5
1936.....	76.8	69.0	74.2	81.4	79.1	82.1	83.1	79.3	81.5	88.1	84.9	90.4
1937.....	87.7	83.1	95.4	90.4	85.1	82.9	85.7	80.6	81.0	82.7	79.4	81.5
1938.....	74.1	67.4	71.7	69.7	68.2	72.4	76.9	73.1	71.3	71.2	73.9	78.8
1939.....	73.1	65.3	73.8	67.6	73.0	70.3	68.8	72.7	75.5	71.2	75.1	75.4
1940.....	74.9	72.3	73.1	74.0	75.6	73.6	74.9	74.3	73.6	77.0	80.6	78.4
1941.....	92.7	77.8	79.6	81.2	84.1	86.6	88.4	91.5	88.5	95.8	93.1	96.8
1942.....	92.2	89.5	97.7	93.1	89.6	94.0	97.0	102.0	103.4	98.2	99.2	101.0
1943.....	99.7	93.4	110.7	119.3	118.8	124.0	124.8	125.6	141.7	129.2	134.2	124.9
1944.....	127.4	128.4	140.3	130.2	137.8	144.3	136.1	142.1	139.8	135.1	150.0	141.5
1945.....	149.7	133.4	154.5	139.0	157.8	173.7	161.5	165.5	152.8	160.8	173.0	167.8

Bank Debits, San Francisco

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	80.9	71.4	79.4	71.9	83.8	83.8	97.7	98.7	98.9	107.6	97.7	115.6
1920.....	112.4	93.1	113.3	110.1	110.6	119.6	120.4	111.7	115.6	117.3	113.0	118.7
1921.....	104.7	83.1	109.2	92.8	88.7	89.5	79.2	82.4	89.6	94.4	93.1	101.2
1922.....	86.5	74.7	88.1	83.3	84.2	87.1	84.5	84.4	90.3	89.6	86.2	91.3
1923.....	92.6	81.1	105.6	92.8	96.6	98.9	89.6	88.2	90.6	101.4	93.7	99.7
1924.....	97.1	97.1	101.0	95.3	94.3	92.8	96.4	93.7	95.2	102.2	94.3	105.6
1925.....	109.6	111.9	116.9	105.0	101.2	113.3	115.3	111.2	112.1	127.8	112.9	133.8
1926.....	125.6	138.6	143.0	124.2	116.7	120.4	128.2	117.3	119.8	125.6	111.6	131.5
1927.....	131.2	140.1	160.1	146.5	137.5	143.1	142.1	134.1	153.1	170.5	157.9	178.7
1928.....	163.5	170.8	200.8	179.8	213.7	226.5	155.6	154.8	175.9	174.6	176.1	200.3
1929.....	171.3	156.1	190.8	148.6	157.6	151.7	159.4	173.1	167.0	221.8	173.3	155.3
1930.....	154.2	136.3	182.6	155.1	151.2	154.3	147.1	149.8	137.1	152.1	131.0	144.6
1931.....	137.0	114.0	124.0	120.4	116.9	114.1	107.3	107.6	108.4	102.5	79.4	99.2
1932.....	91.2	77.1	89.0	81.2	67.6	75.0	79.0	75.2	72.2	75.3	62.8	77.7
1933.....	71.9	67.1	63.4	64.1	69.4	78.0	88.1	75.9	74.0	80.8	72.1	81.4
1934.....	86.1	70.3	89.3	85.2	74.8	83.6	78.4	81.2	77.5	84.0	76.0	89.3
1935.....	83.4	80.0	92.5	92.5	89.7	98.3	102.5	91.7	90.6	103.0	106.6	110.3
1936.....	100.1	102.4	112.3	111.8	93.2	103.3	102.4	100.2	98.8	111.7	103.9	128.3
1937.....	115.9	101.9	118.4	113.7	101.4	105.7	108.1	108.2	109.8	109.9	100.1	117.9
1938.....	97.9	80.1	102.7	87.9	83.2	89.3	97.7	93.2	91.8	95.4	95.4	116.4
1939.....	93.5	81.0	101.0	90.7	87.8	94.0	90.4	95.7	102.1	100.4	101.3	110.5
1940.....	99.1	94.3	106.4	97.7	94.4	87.7	100.1	92.9	101.1	112.3	102.5	115.5
1941.....	107.9	102.8	118.0	110.6	104.5	115.7	116.9	116.0	121.3	131.1	123.9	152.5
1942.....	125.5	116.2	131.6	121.0	117.4	132.6	139.4	140.9	152.7	159.9	146.8	185.3
1943.....	152.9	146.9	173.7	173.6	158.6	175.5	177.6	173.5	187.6	177.5	181.0	207.3
1944.....	191.2	183.7	204.0	174.8	158.6	175.5	189.1	190.9	189.7	197.7	204.1	223.1
1945.....	203.8	184.6	236.2	192.0	206.2	226.3	200.3	194.8	203.8	224.8	211.0	249.8

BANK DEBITS, SAN FRANCISCO
(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	84.0	80.9	76.6	75.9	91.9	87.1	102.9	105.3	104.5	106.7	104.6	109.8
1920.....	114.5	103.5	117.6	114.1	118.9	122.0	123.7	116.9	119.8	114.1	118.9	110.6
1921.....	104.8	90.6	101.4	94.3	93.6	89.6	80.3	84.7	91.1	90.1	96.1	92.6
1922.....	84.9	80.0	80.4	83.0	87.2	85.5	84.1	85.1	90.1	84.0	87.3	82.0
1923.....	89.2	85.3	94.6	90.9	98.3	95.4	87.5	87.3	88.9	93.3	93.3	87.9
1924.....	91.9	100.3	88.8	91.7	94.2	87.9	92.5	91.2	91.7	92.4	92.2	91.4
1925.....	101.9	113.5	101.0	99.3	99.3	105.5	108.8	106.3	106.1	113.5	108.4	114.0
1926.....	114.7	138.2	121.5	115.5	112.6	110.2	118.9	110.2	111.5	109.7	105.5	110.1
1927.....	117.9	137.4	133.7	133.8	130.3	128.8	129.4	123.9	140.1	146.5	146.6	147.0
1928.....	144.4	164.5	164.9	161.4	199.4	200.4	139.5	140.7	158.3	147.4	160.8	162.2
1929.....	148.7	148.1	154.1	131.3	144.5	132.0	140.5	154.7	147.9	184.3	155.8	123.7
1930.....	131.8	127.2	145.1	134.9	136.4	132.2	127.6	131.8	119.5	124.4	115.9	113.3
1931.....	115.2	104.6	97.0	103.0	103.9	96.2	91.6	93.2	92.9	82.5	69.1	76.5
1932.....	75.5	69.7	68.5	68.4	59.1	62.3	66.4	64.1	61.0	59.6	53.8	59.0
1933.....	58.6	59.7	48.1	53.1	59.8	63.7	72.9	63.7	61.5	63.1	60.9	60.9
1934.....	69.2	61.6	66.7	69.6	63.5	67.3	64.0	67.2	63.5	64.6	63.1	65.8
1935.....	65.9	69.1	68.0	74.4	74.9	78.0	82.3	74.6	73.2	78.0	87.4	80.1
1936.....	78.0	87.1	81.4	88.6	76.7	80.7	81.0	80.5	78.5	83.4	83.9	91.8
1937.....	89.0	85.4	84.6	88.8	82.3	81.4	84.3	85.6	86.1	80.9	79.6	83.2
1938.....	74.1	66.2	72.3	67.7	66.6	67.8	75.2	72.7	71.0	69.2	74.9	81.0
1939.....	70.6	66.2	71.0	71.3	73.0	72.2	68.2	73.2	75.0	71.8	75.4	72.4
1940.....	99.1	94.3	106.4	97.7	94.4	87.7	100.1	92.9	101.1	112.3	102.5	115.5
1941.....	107.9	102.8	118.0	110.6	104.5	115.7	116.9	116.0	121.3	131.1	123.9	152.5
1942.....	125.5	116.2	131.6	121.0	117.4	132.6	139.4	140.9	152.7	159.9	146.8	185.3
1943.....	109.4	113.8	115.6	129.1	125.0	127.7	127.0	125.6	130.5	120.2	127.5	128.7
1944.....	135.0	140.5	134.0	129.1	123.4	126.1	133.5	136.4	130.2	132.0	142.1	136.6
1945.....	142.0	139.3	153.1	139.1	158.3	160.5	139.5	137.4	138.1	148.2	144.9	151.1

Bank Debits, Chicago

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	93.3	75.7	84.2	85.8	92.8	98.8	105.0	100.4	99.3	107.4	105.8	118.1
1920	116.1	95.3	117.2	106.8	106.9	111.5	116.4	104.1	110.5	115.9	103.6	113.7
1921	100.6	80.9	90.1	85.7	85.2	86.7	84.2	88.5	87.7	94.1	89.6	97.2
1922	91.3	82.6	102.0	91.2	93.4	99.5	87.7	88.6	91.4	101.7	90.9	102.4
1923	109.5	101.7	106.6	106.1	107.7	102.1	99.3	91.8	91.4	101.7	97.7	109.5
1924	104.1	89.7	105.7	101.9	104.1	101.7	103.4	99.5	97.7	109.4	101.3	122.0
1925	123.9	100.1	123.9	113.1	116.2	112.5	120.4	107.6	111.9	126.5	109.9	129.1
1926	131.4	112.7	135.4	123.4	121.2	125.2	127.8	119.9	113.1	123.4	115.7	138.4
1927	127.4	113.0	134.7	132.6	137.3	137.2	126.8	132.5	133.5	138.5	132.1	150.8
1928	145.2	123.1	152.6	154.5	158.1	154.8	135.5	135.8	140.1	156.1	148.9	172.1
1929	165.4	150.6	180.5	154.6	155.6	154.4	171.7	187.5	172.3	208.7	180.2	158.3
1930	147.4	123.6	151.2	145.8	146.0	153.6	138.5	122.9	127.4	137.8	110.3	130.7
1931	120.1	94.1	109.5	112.4	112.0	112.5	107.3	95.0	89.8	93.8	81.3	89.9
1932	80.5	66.5	78.1	81.4	66.5	74.1	65.8	68.6	64.5	63.6	54.8	63.1
1933	60.6	57.8	[a]	62.0	66.1	74.1	86.0	74.5	70.4	73.4	67.4	68.4
1934	66.9	62.1	79.6	84.8	77.8	83.1	77.5	75.4	72.1	78.9	70.2	85.8
1935	84.6	69.5	94.5	91.1	84.7	89.8	95.8	90.1	86.8	88.4	93.4	111.6
1936	94.7	88.5	114.0	99.4	96.7	115.1	103.4	98.6	102.3	115.4	105.0	138.2
1937	117.4	98.9	132.0	109.3	101.4	108.7	109.2	101.4	104.2	105.8	94.4	114.1
1938	94.9	79.6	102.1	90.8	83.4	100.2	89.4	87.5	91.5	104.7	90.1	123.2
1939	98.0	76.4	106.6	94.9	96.7	113.6	96.8	98.9	106.3	97.7	96.3	132.0
1940	112.2	92.7	116.2	109.3	107.2	101.2	100.4	97.7	92.9	118.7	106.7	127.4
1941	118.8	100.5	138.9	123.4	121.2	132.4	126.3	128.5	131.0	143.7	133.4	167.9
1942	141.3	117.4	155.7	140.2	145.6	150.4	146.3	143.7	156.7	164.2	145.3	181.1
1943	151.5	146.9	192.8	194.0	159.5	173.5	175.1	165.9	217.1	174.7	177.0	204.2
1944	189.1	185.7	229.3	163.4	176.0	214.8	202.0	182.9	184.3	215.9	210.2	250.4
1945	198.1	168.8	231.1	186.6	202.9	245.1	183.7	171.1	181.4	195.9	195.3	269.6

[a] Data not available.

Bank Debits, Chicago

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	95.7	90.9	84.3	92.7	99.1	104.1	112.9	111.8	110.4	110.0	116.4	115.4
1920.....	116.7	112.0	114.9	113.0	111.9	115.2	122.6	113.6	120.4	116.3	111.7	108.8
1921.....	99.1	93.3	86.6	88.9	87.4	87.8	87.0	94.7	93.7	92.6	94.7	91.2
1922.....	88.2	93.3	96.1	92.7	93.9	98.8	88.9	93.0	95.7	98.2	94.3	94.3
1923.....	103.8	112.8	98.6	105.8	106.2	99.5	98.7	94.6	93.9	96.3	99.4	98.9
1924.....	96.8	97.6	95.9	99.8	100.8	97.2	100.8	100.5	98.6	101.7	101.2	108.2
1925.....	113.1	106.9	110.4	108.7	110.5	115.0	115.3	106.8	110.9	115.5	107.8	112.4
1926.....	117.8	118.2	118.4	116.5	113.1	115.4	120.2	116.9	110.0	110.6	111.5	118.3
1927.....	112.1	116.4	115.7	123.0	125.9	124.2	117.2	126.8	127.6	122.0	125.0	126.7
1928.....	125.6	124.6	128.8	140.8	142.4	137.8	123.0	127.8	131.6	135.1	138.5	142.1
1929.....	140.6	149.8	149.9	138.5	137.8	135.0	153.3	173.4	159.2	177.5	164.7	128.5
1930.....	133.3	128.2	122.9	125.9	130.5	123.7	118.7	109.9	112.8	116.8	103.4	99.9
1931.....	106.8	95.9	87.5	95.4	98.4	89.1	90.4	83.5	78.2	78.2	75.0	67.6
1932.....	70.4	66.7	61.4	68.0	57.5	57.7	54.5	59.4	55.3	52.1	49.7	46.7
1933.....	52.1	57.1	[a]	51.0	56.3	56.9	70.2	63.4	59.4	59.3	60.2	50.5
1934.....	56.7	60.4	60.7	68.6	65.1	62.7	62.2	63.2	59.9	62.7	61.7	61.5
1935.....	70.5	66.5	70.9	72.5	69.9	66.7	75.7	74.4	71.0	69.2	80.8	78.8
1936.....	77.8	83.4	84.2	78.0	78.5	84.2	80.6	80.1	82.4	88.9	89.5	96.0
1937.....	94.9	91.7	96.0	84.5	81.1	78.4	83.8	81.1	82.6	80.4	79.3	78.1
1938.....	75.6	72.8	73.2	69.1	65.8	71.1	67.6	69.0	71.5	78.3	74.6	83.1
1939.....	76.9	68.8	75.3	71.2	75.1	79.5	72.1	76.9	81.9	72.1	78.6	87.8
1940.....	84.5	80.9	77.0	83.5	82.8	73.5	76.8	78.6	71.0	83.3	82.4	82.1
1941.....	88.2	86.4	90.6	92.9	92.2	94.8	95.4	101.9	98.7	99.4	101.5	106.7
1942.....	103.4	99.5	100.2	104.2	109.3	106.2	108.9	112.4	116.4	112.0	109.0	113.6
1943.....	109.4	122.9	122.4	142.1	118.1	120.8	128.6	128.0	159.1	117.5	131.0	126.2
1944.....	134.7	153.2	143.6	118.1	128.4	147.6	146.3	139.2	133.3	143.2	153.5	152.7
1945.....	139.2	137.4	142.8	133.0	146.1	166.1	131.2	128.5	129.4	128.3	140.8	162.3

[a] Data not available.

Bank Debits, Detroit

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	53.9	46.5	50.9	51.3	59.9	62.5	63.9	66.0	72.3	74.2	70.1	75.5
1920	82.5	67.4	85.1	81.3	73.8	84.5	83.6	77.9	81.8	78.1	68.7	70.0
1921	56.9	46.2	54.7	56.6	58.6	56.0	63.5	60.4	58.2	57.7	52.7	59.9
1922	52.5	47.9	61.3	58.1	62.4	64.4	68.1	69.8	65.0	65.7	64.7	77.2
1923	73.9	69.2	81.1	79.7	84.1	85.5	75.7	74.8	74.5	80.1	77.5	82.6
1924	82.6	78.0	86.8	84.5	84.8	78.7	78.4	77.4	76.7	83.0	77.3	87.0
1925	89.9	76.3	90.6	95.5	98.6	106.0	104.4	94.8	100.7	111.1	102.1	112.0
1926	104.2	90.0	110.4	110.4	103.3	110.9	106.8	103.9	99.4	106.3	93.5	103.5
1927	100.2	83.5	95.1	101.8	97.9	109.6	107.1	102.0	102.8	102.3	94.2	115.5
1928	110.9	100.1	123.1	114.5	128.2	135.2	127.9	134.7	147.6	147.3	134.5	187.6
1929	158.9	125.4	137.0	146.2	157.0	145.0	150.7	145.9	162.3	157.4	133.9	130.0
1930	125.4	103.4	126.1	127.4	124.8	131.0	118.9	117.1	107.8	101.3	86.3	116.6
1931	102.7	81.4	107.5	98.6	96.0	106.7	87.4	81.6	83.9	79.4	65.4	82.2
1932	93.9	65.0	66.9	67.2	64.0	67.4	61.5	56.1	49.6	48.4	41.8	59.7
1933	59.8	21.7	[a]	25.8	36.9	41.9	41.5	42.7	47.9	45.1	39.8	48.2
1934	60.6	58.7	72.8	71.7	73.7	69.5	66.3	64.5	55.2	57.7	56.3	77.8
1935	80.5	78.1	89.7	85.4	87.9	83.7	82.3	80.8	73.1	86.2	92.7	114.7
1936	100.4	89.6	105.9	102.2	100.5	109.8	104.9	98.2	91.6	106.1	105.3	144.0
1937	119.7	100.3	131.8	122.7	126.6	122.7	116.9	110.4	105.7	117.9	117.5	121.8
1938	97.6	75.6	88.4	82.2	82.8	83.1	77.0	76.3	81.8	92.1	100.5	117.6
1939	104.1	89.0	104.0	97.3	104.5	98.0	96.6	94.5	99.2	110.6	110.2	129.5
1940	124.1	108.0	118.7	119.1	130.2	113.8	116.3	110.4	112.2	139.9	146.5	159.1
1941	147.9	134.9	161.2	153.3	162.8	175.4	175.6	158.8	158.5	174.8	164.8	194.6
1942	173.0	153.0	176.5	179.2	181.3	194.4	212.4	208.3	218.0	228.8	218.7	267.5
1943	244.7	214.8	274.0	284.9	249.5	276.0	260.4	267.5	313.1	281.6	267.7	320.1
1944	301.0	297.7	315.8	285.0	287.3	320.9	295.4	304.5	286.2	277.3	290.8	339.3
1945	294.2	263.8	315.0	279.9	290.7	312.4	256.7	230.8	215.4	220.3	207.0	245.3

[a] Data not available.

Bank Debits, Detroit

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	112.8	111.8	102.2	102.6	117.3	117.5	120.1	126.2	134.7	134.0	136.8	132.0
1920.....	182.5	172.1	181.8	173.4	154.1	170.3	169.2	160.6	164.9	152.7	145.6	133.3
1921.....	111.4	104.5	103.5	107.4	109.1	100.4	114.5	111.0	104.7	100.9	99.8	102.1
1922.....	92.1	97.4	104.3	99.1	104.4	104.0	110.7	115.8	105.6	103.8	110.8	119.3
1923.....	117.7	127.5	125.3	123.4	128.0	125.6	112.0	113.0	110.3	115.5	121.4	116.6
1924.....	120.1	131.4	122.7	119.8	118.3	106.0	106.4	107.5	104.6	110.0	111.4	113.1
1925.....	102.4	118.4	118.1	124.9	126.8	132.0	131.1	121.7	126.9	136.4	136.3	134.8
1926.....	129.4	129.5	133.5	134.1	123.6	128.3	124.6	124.0	116.5	121.3	116.1	116.0
1927.....	115.9	112.1	107.3	115.4	109.3	118.4	116.7	113.7	112.6	109.2	109.4	121.3
1928.....	120.2	125.8	130.2	121.5	134.1	136.9	130.7	140.9	151.7	147.8	146.9	185.0
1929.....	161.8	148.2	136.2	146.0	154.5	138.2	145.0	143.9	57.4	148.8	137.8	120.9
1930.....	113.8	111.1	113.7	120.2	117.2	118.0	112.8	114.9	107.1	95.8	84.7	92.6
1931.....	88.1	82.8	91.7	88.1	85.4	91.1	78.6	76.0	79.2	71.2	61.0	62.0
1932.....	76.5	62.9	54.2	57.0	54.0	54.7	52.5	49.5	44.5	41.3	37.1	42.8
1933.....	46.3	20.0	[a]	20.9	29.7	32.4	33.8	36.0	40.9	36.7	33.6	32.9
1934.....	44.8	51.5	54.0	55.2	56.6	51.3	51.5	52.0	45.1	44.8	45.5	50.9
1935.....	56.9	65.5	63.1	63.0	64.5	59.1	61.2	62.3	57.1	64.1	71.6	71.9
1936.....	68.0	71.8	71.4	72.3	70.7	74.3	74.8	72.5	68.7	75.6	78.0	86.5
1937.....	77.7	77.4	85.3	83.3	85.6	79.7	80.1	78.2	76.0	80.7	83.6	70.3
1938.....	61.0	56.1	55.0	53.6	53.8	51.9	50.7	52.1	56.6	60.7	68.9	65.3
1939.....	62.6	63.5	62.3	61.1	65.4	58.9	61.3	62.1	66.1	70.3	72.7	69.4
1940.....	71.9	74.3	68.5	72.1	72.5	66.1	71.2	70.0	72.2	85.8	93.3	82.2
1941.....	82.7	89.5	89.9	89.6	94.8	98.2	103.7	97.3	98.5	103.4	101.4	97.1
1942.....	93.5	98.2	95.1	101.3	102.1	105.3	121.4	123.3	131.0	130.9	130.1	129.2
1943.....	128.0	133.4	142.8	155.8	135.9	144.6	144.0	153.3	182.1	156.1	154.3	149.7
1944.....	152.4	179.0	159.5	150.9	151.6	163.0	158.2	169.1	161.4	149.0	162.5	153.8
1945.....	144.4	153.8	154.2	143.8	148.8	153.9	133.4	124.3	117.9	114.8	112.2	107.8

[a] Data not available.

Bank Debits, Cleveland

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	107.4	89.1	103.0	113.1	107.7	125.1	137.1	118.6	127.7	132.6	125.5	150.8
1920	146.8	115.0	138.4	145.1	127.5	143.5	155.9	134.2	136.4	148.6	133.0	150.8
1921	134.1	86.0	101.5	105.9	95.1	95.2	88.7	83.1	87.8	89.6	94.7	110.4
1922	95.6	81.4	86.5	96.2	91.1	108.0	105.0	102.2	104.9	109.8	99.9	121.8
1923	125.9	99.1	114.9	123.4	122.0	126.4	120.8	114.3	111.8	123.7	108.1	128.3
1924	117.3	106.5	114.3	131.4	111.3	112.9	113.9	104.3	109.0	120.5	106.2	137.1
1925	131.6	103.1	114.7	134.6	123.4	134.9	138.6	120.6	122.8	139.0	122.4	140.0
1926	150.5	108.1	130.8	146.9	125.2	137.1	150.2	129.3	131.6	152.1	134.6	162.1
1927	155.7	128.4	139.4	156.9	139.0	156.5	156.6	137.2	145.9	159.6	136.0	176.0
1928	162.7	131.8	144.1	152.7	145.4	162.7	150.5	142.3	148.1	178.8	147.0	193.2
1929	165.5	159.9	167.4	182.6	162.0	168.5	180.1	178.3	173.6	197.2	167.9	184.8
1930	168.9	131.6	156.8	165.5	153.3	157.0	154.3	124.0	134.7	158.2	126.2	172.9
1931	186.6	105.8	124.8	127.2	108.9	123.2	124.9	107.6	112.4	120.5	85.4	100.3
1932	108.0	71.4	76.6	79.3	69.3	73.1	78.4	64.9	65.4	71.7	61.9	72.0
1933	69.5	64.2	[a]	53.6	53.5	60.0	70.3	69.9	66.4	68.3	61.3	64.2
1934	64.3	56.4	71.3	73.2	72.9	82.8	77.3	74.9	70.0	72.9	66.5	82.1
1935	75.9	64.8	77.3	84.1	84.7	89.4	88.4	87.1	85.0	89.3	94.6	103.8
1936	96.8	85.9	94.0	97.3	101.8	106.7	107.1	101.3	108.1	114.6	101.6	135.8
1937	112.9	96.7	120.2	120.4	114.2	120.2	122.5	114.8	117.3	119.2	101.8	119.6
1938	93.2	75.3	86.3	89.6	95.0	89.7	88.4	83.3	91.4	107.4	95.1	112.9
1939	96.2	83.3	92.4	90.0	97.6	100.4	102.7	101.9	106.6	119.0	114.4	132.7
1940	114.5	96.4	106.4	106.8	114.2	116.1	121.0	119.0	122.4	134.0	130.0	162.0
1941	132.2	114.0	138.8	144.3	159.1	154.8	158.2	146.5	163.3	173.3	148.0	198.5
1942	161.5	140.3	165.2	179.9	172.4	185.7	185.2	173.1	137.4	200.7	177.0	234.5
1943	187.7	162.6	201.4	228.3	201.2	220.6	219.1	212.1	261.5	231.3	218.7	252.4
1944	232.7	221.1	225.0	230.6	235.1	285.8	255.8	233.4	242.9	256.8	250.6	295.6
1945	252.9	204.4	244.1	236.9	259.8	319.3	243.4	233.0	214.6	238.6	225.5	299.6

[a] Data not available.

Bank Debits, Cleveland

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	101.4	104.6	108.0	108.5	115.0	122.1	131.6	125.8	131.8	124.2	132.0	131.4
1920.....	135.2	131.7	141.6	135.7	132.6	136.8	146.0	138.9	137.4	135.7	136.7	128.2
1921.....	120.5	96.1	101.3	96.6	96.6	88.5	81.0	83.9	86.2	79.9	95.0	91.6
1922.....	83.8	88.7	84.3	85.8	90.4	98.1	93.7	100.8	100.7	95.7	98.0	98.7
1923.....	107.9	105.5	109.4	107.5	118.2	112.1	105.5	110.3	105.0	105.3	103.6	101.6
1924.....	98.3	110.9	106.4	111.9	105.4	98.0	97.2	98.3	100.0	100.4	99.5	106.2
1925.....	107.7	105.0	104.5	112.1	114.4	114.5	115.7	111.3	110.2	113.2	112.1	106.1
1926.....	120.6	107.7	116.6	119.8	113.6	113.9	122.7	115.9	115.7	121.2	120.7	120.2
1927.....	122.2	125.3	121.7	125.2	123.5	127.3	125.3	121.3	125.6	124.4	119.4	127.8
1928.....	125.1	125.8	123.3	119.4	126.5	129.6	117.9	123.3	124.8	136.7	126.5	137.5
1929.....	124.6	149.7	140.2	139.9	138.1	131.6	138.3	151.2	143.3	147.7	141.6	128.9
1930.....	129.6	124.9	127.5	131.0	123.8	121.3	115.4	99.8	105.9	114.5	103.7	117.5
1931.....	140.4	98.4	100.1	98.8	86.3	93.3	91.5	85.0	86.7	85.5	68.8	66.9
1932.....	79.7	65.2	60.3	60.4	53.8	54.3	56.3	50.3	49.5	49.9	49.0	47.1
1933.....	50.3	57.5	[a]	40.1	40.8	43.7	49.6	53.1	49.3	46.7	47.6	41.2
1934.....	45.7	49.6	54.1	53.8	54.5	59.2	53.6	56.0	51.0	48.9	50.7	51.8
1935.....	53.0	56.0	57.5	60.6	62.3	62.8	60.2	63.9	60.9	58.9	70.8	64.3
1936.....	66.4	72.9	68.7	68.9	73.5	73.7	71.6	73.0	76.1	74.2	74.8	82.7
1937.....	76.1	80.6	86.4	83.7	81.0	81.6	80.5	81.3	81.1	75.9	73.6	71.5
1938.....	61.7	61.7	60.9	61.4	66.2	59.8	57.1	58.0	62.2	67.2	67.6	66.4
1939.....	62.6	67.1	64.2	60.5	66.9	65.8	65.2	69.7	71.2	73.3	80.0	76.8
1940.....	77.3	76.8	72.8	71.3	75.4	71.5	77.7	82.1	79.2	83.2	88.7	88.3
1941.....	87.7	89.4	93.4	94.8	103.2	93.7	99.9	99.4	103.9	105.9	99.3	106.3
1942.....	105.5	108.2	109.4	116.3	110.1	110.7	115.1	115.6	117.3	120.7	116.8	123.4
1943.....	120.6	123.4	131.3	145.3	126.5	129.4	134.0	139.4	161.4	137.0	142.1	131.0
1944.....	147.3	165.2	144.4	144.5	145.5	165.1	154.1	151.0	147.4	149.6	160.3	151.1
1945.....	157.6	150.5	154.3	146.2	158.3	181.6	144.4	148.5	128.2	136.9	142.1	150.8

[a] Data not available.

BANK DEBITS, PITTSBURGH

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	110.0	93.7	107.1	101.6	103.2	121.6	115.2	103.8	109.5	117.1	107.7	128.5
1920	123.0	107.3	133.2	126.4	122.6	137.5	135.5	118.2	130.4	146.2	142.8	154.8
1921	121.1	121.0	113.6	105.9	103.5	105.7	90.6	87.0	89.1	101.2	94.0	103.7
1922	96.0	87.0	95.8	98.8	99.0	108.8	106.0	105.3	104.3	116.2	108.0	156.4
1923	120.5	122.9	126.6	120.6	128.6	125.8	129.3	117.1	109.2	128.7	116.3	132.4
1924	128.7	116.0	127.3	126.2	125.0	121.0	125.5	118.0	111.1	132.7	115.5	137.4
1925	148.4	126.0	140.7	136.2	124.7	138.5	145.8	125.9	128.8	157.3	140.8	153.2
1926	150.3	129.2	142.9	135.5	131.4	147.9	144.3	127.9	131.6	146.4	133.7	149.2
1927	156.2	151.1	155.1	169.9	145.9	180.6	155.1	132.5	132.3	138.7	134.0	150.1
1928	146.6	129.6	142.4	146.5	148.1	165.3	143.1	137.5	142.4	161.7	156.4	175.3
1929	161.7	153.7	163.5	169.2	162.2	157.9	184.5	163.4	152.3	187.0	177.6	157.1
1930	144.5	128.2	148.8	144.7	159.7	175.4	161.3	131.3	140.8	148.6	121.0	153.3
1931	134.1	115.9	113.7	121.8	113.5	112.9	107.0	94.1	107.6	113.2	88.2	118.2
1932	96.2	75.5	74.0	81.2	76.0	76.0	71.8	68.6	63.0	68.1	61.9	75.1
1933	69.6	65.2	[a]	63.4	67.7	89.8	82.3	76.2	67.1	75.9	70.2	79.2
1934	77.4	73.8	74.7	81.9	87.7	93.3	86.7	73.0	74.2	79.0	92.5	107.1
1935	86.4	79.4	86.6	88.3	95.4	101.4	91.4	89.1	94.9	98.6	95.7	112.7
1936	98.8	89.6	88.7	112.7	102.7	114.4	112.5	100.9	91.1	115.9	108.5	112.4
1937	124.3	99.6	115.3	120.5	140.7	120.3	123.0	114.5	110.0	117.0	99.9	136.9
1938	97.1	76.8	88.6	88.0	80.9	87.3	85.7	89.2	81.8	87.3	84.3	132.7
1939	90.8	79.3	88.5	84.1	83.0	92.9	93.5	86.5	98.6	101.9	102.7	128.1
1940	106.9	97.2	104.2	96.8	105.2	107.1	109.5	104.0	125.3	113.5	111.8	169.3
1941	154.3	111.6	128.8	135.5	126.6	141.9	138.5	139.6	143.6	151.1	137.8	204.1
1942	149.6	135.8	156.5	147.8	153.0	169.3	163.6	149.6	166.2	174.2	158.7	209.3
1943	160.0	149.7	176.5	202.4	167.2	204.3	185.6	172.5	215.3	187.0	178.3	225.5
1944	202.3	181.7	196.9	188.4	187.6	225.7	195.3	180.5	195.7	189.0	214.8	239.0
1945	198.3	173.4	201.9	193.4	205.4	243.7	191.9	184.4	165.5	177.7	176.5	233.7

[a] Data not available.

Bank Debits, Pittsburgh

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	96.8	90.1	95.8	92.3	96.2	106.7	102.4	102.2	107.3	100.5	100.3	106.5
1920.....	106.9	101.9	117.8	113.4	112.9	119.3	118.9	115.1	126.3	124.1	131.5	126.8
1921.....	104.1	113.6	99.3	94.0	94.3	90.7	78.7	83.7	85.3	85.0	85.5	83.9
1922.....	81.6	80.8	82.7	86.6	89.2	92.3	91.0	100.1	98.7	96.4	97.1	125.2
1923.....	108.8	112.8	108.1	104.5	114.5	105.5	109.7	110.1	102.3	105.6	103.5	104.8
1924.....	106.9	105.3	107.5	108.2	110.1	100.3	105.3	109.7	102.8	107.7	101.6	107.6
1925.....	121.9	113.1	117.5	115.5	108.6	113.6	121.0	115.8	117.9	126.2	122.6	118.8
1926.....	122.1	114.7	118.0	113.6	113.1	120.0	118.5	116.3	119.2	116.2	115.1	114.4
1927.....	125.5	132.7	126.7	140.9	124.3	144.9	126.0	119.2	118.5	107.2	114.1	113.8
1928.....	116.6	112.6	115.1	120.2	124.8	131.2	115.0	122.3	126.1	125.6	131.8	131.5
1929.....	127.3	132.1	130.8	137.4	135.2	124.1	146.6	143.8	133.5	143.8	148.1	116.6
1930.....	115.7	116.9	127.7	116.9	126.7	130.2	125.5	110.9	120.6	116.0	103.0	104.0
1931.....	106.2	104.6	96.6	97.4	89.1	83.0	82.4	78.6	91.2	81.5	74.3	79.4
1932.....	75.4	67.4	62.2	64.2	59.1	55.2	54.7	56.7	52.8	52.1	51.6	49.9
1933.....	54.0	57.6	*	49.7	52.1	64.6	62.1	62.4	55.7	57.5	58.0	52.1
1934.....	59.4	64.7	61.6	63.5	66.8	66.5	64.7	59.2	61.0	59.2	75.6	69.8
1935.....	65.7	68.8	70.6	67.9	71.9	71.5	67.6	71.5	77.3	73.2	77.5	72.7
1936.....	74.4	76.8	71.7	85.7	76.7	79.9	82.4	80.1	73.4	85.2	87.0	71.8
1937.....	92.7	84.6	92.2	90.8	104.1	83.3	89.2	90.1	87.8	85.1	79.3	86.6
1938.....	71.7	64.6	70.2	65.7	59.3	59.8	61.6	69.5	64.7	62.9	66.3	83.1
1939.....	66.2	66.3	65.6	64.5	64.6	64.3	69.5	69.8	70.7	74.7	78.5	74.5
1940.....	77.2	80.6	76.6	73.5	81.1	73.5	80.7	82.7	89.0	82.4	84.7	97.6
1941.....	110.4	91.6	93.8	102.0	96.7	96.4	101.2	109.9	101.1	108.7	103.4	116.5
1942.....	106.1	110.4	112.8	110.2	115.7	113.9	118.4	116.8	115.9	124.2	118.0	118.4
1943.....	112.3	120.6	126.1	149.5	125.3	136.2	133.1	133.4	148.8	132.1	131.3	126.4
1944.....	140.7	145.1	139.4	137.8	139.4	149.1	138.7	138.4	134.1	132.3	156.8	132.8
1945.....	136.7	137.2	141.6	140.2	151.2	159.6	135.0	140.0	112.4	123.2	127.7	128.7

* Data not available.

Bank Debits, United States

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	94.4	76.8	86.9	86.3	93.8	99.1	104.6	99.2	101.6	113.7	107.8	121.9
1920	122.2	99.6	118.8	114.2	110.5	115.4	116.9	106.2	111.1	117.3	109.7	115.4
1921	101.1	82.0	93.0	89.2	96.2	89.0	85.2	83.8	87.2	93.9	89.6	98.0
1922	89.2	78.9	92.9	88.0	91.7	96.5	91.8	89.0	93.0	103.5	96.2	110.0
1923	110.5	95.0	110.3	105.7	108.8	109.7	102.1	97.3	97.0	111.0	104.0	114.4
1924	108.9	98.4	107.8	106.0	104.7	102.8	104.8	99.8	102.4	117.5	105.9	122.6
1925	125.3	104.4	119.3	115.8	114.7	121.9	121.2	111.6	117.4	135.0	120.0	135.3
1926	132.6	112.9	131.8	126.6	120.5	126.2	130.9	116.7	119.9	133.6	121.3	137.6
1927	131.8	116.7	135.0	132.4	128.5	133.8	128.8	123.8	131.3	141.1	133.7	148.9
1928	140.4	122.2	145.2	141.7	148.0	151.8	134.2	131.4	137.3	155.6	145.4	166.6
1929	157.8	137.6	157.8	150.4	148.8	148.3	159.6	159.0	153.2	180.9	160.0	151.1
1930	144.3	120.8	140.3	136.6	137.0	138.3	130.0	117.6	119.4	133.0	110.6	129.8
1931	121.9	96.0	109.1	110.2	105.9	109.0	103.6	92.8	93.4	101.8	82.0	96.1
1932	89.3	72.3	77.1	80.7	70.2	72.5	70.3	66.0	66.1	69.4	61.4	72.0
1933	67.7	58.4	[a]	59.6	64.7	72.9	78.0	69.5	68.6	73.2	67.0	74.6
1934	74.1	66.2	79.1	80.2	79.2	82.9	78.1	75.4	71.7	80.6	74.8	87.6
1935	84.2	73.7	88.5	87.9	87.4	88.8	93.0	87.3	84.4	94.6	93.7	104.9
1936	98.3	88.6	100.4	98.3	95.5	106.1	104.6	96.1	98.8	113.1	103.8	130.5
1937	114.6	99.0	121.4	112.7	108.4	112.5	113.3	103.5	104.8	112.0	102.1	117.1
1938	98.9	82.2	97.6	93.2	90.0	96.4	93.7	90.0	92.4	101.7	95.7	118.5
1939	100.3	85.4	102.3	94.6	99.8	104.9	99.3	98.3	104.1	106.9	104.7	125.8
1940	112.2	97.4	109.8	108.1	110.4	105.9	108.1	102.9	102.6	120.0	117.0	136.7
1941	126.4	109.3	132.5	129.6	133.7	139.6	138.5	135.0	136.6	153.4	140.9	174.8
1942	151.8	132.3	156.0	148.6	153.0	158.9	160.1	156.4	168.5	180.5	165.7	202.7
1943	172.6	159.7	198.1	211.7	183.1	196.4	196.4	187.4	227.2	200.1	197.8	225.6
1944	213.1	204.9	221.2	196.1	202.5	239.3	211.2	204.1	206.5	215.4	226.8	255.5
1945	226.4	195.1	234.4	212.6	228.3	268.0	215.1	206.5	200.6	219.1	220.5	268.4

[a] Data not available.

Bank Debits, United States
(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	102.3	97.1	94.5	99.2	109.7	110.3	118.0	119.2	118.1	119.4	122.6	123.5
1920.....	128.7	122.4	125.6	127.5	125.7	124.9	128.3	124.1	125.7	119.8	121.4	113.7
1921.....	103.7	98.0	95.6	97.0	95.4	93.8	91.1	95.3	96.1	93.4	96.5	94.0
1922.....	89.0	91.8	93.0	93.1	98.9	99.1	95.5	98.7	99.8	100.3	100.9	102.0
1923.....	107.4	107.7	107.6	109.1	114.3	109.7	103.5	105.1	101.3	104.7	106.3	104.2
1924.....	103.2	108.8	102.6	106.6	107.3	100.3	103.6	105.1	104.3	108.1	105.7	109.0
1925.....	115.9	112.6	110.8	113.6	114.7	115.9	116.9	114.7	116.8	111.8	116.8	117.3
1926.....	119.7	118.9	119.4	121.4	117.5	117.2	123.3	117.1	116.5	117.3	115.4	116.6
1927.....	116.2	120.0	119.4	123.9	122.5	121.4	118.5	121.3	124.6	121.0	124.2	123.3
1928.....	124.2	125.5	129.3	127.7	134.4	132.3	118.5	123.5	127.8	130.1	134.7	134.6
1929.....	136.5	138.2	137.4	132.5	132.2	126.4	137.8	146.2	139.5	147.8	144.9	119.5
1930.....	122.1	118.7	119.4	117.8	119.0	115.3	109.9	105.8	106.3	106.3	98.0	100.4
1931.....	100.9	92.4	90.9	93.0	90.1	89.0	85.6	81.7	81.4	79.7	71.1	72.8
1932.....	72.4	68.1	63.0	66.7	58.4	57.9	56.9	56.9	56.5	53.2	52.2	53.4
1933.....	53.7	53.9	[a]	48.2	52.8	57.1	61.9	58.7	57.4	55.0	55.8	54.3
1934.....	57.7	59.8	61.9	63.6	63.3	63.6	60.7	62.5	58.8	59.4	61.1	62.5
1935.....	64.2	65.3	68.0	68.3	68.5	66.8	70.9	70.9	67.9	68.4	75.0	73.3
1936.....	73.5	77.0	75.6	75.0	73.5	78.3	78.3	76.6	78.0	80.1	81.5	89.4
1937.....	81.1	84.4	89.7	84.3	81.8	81.5	83.1	80.9	81.1	77.9	78.8	78.8
1938.....	71.9	68.5	69.1	70.7	67.3	68.4	69.7	69.6	68.9	71.8	70.9	74.1
1939.....	71.6	69.9	71.2	70.5	73.3	73.1	72.6	74.7	76.2	74.2	76.1	77.3
1940.....	74.3	78.3	75.0	79.0	80.0	72.5	77.6	76.8	73.8	81.8	83.6	82.5
1941.....	87.1	86.2	88.9	93.1	94.8	94.0	97.7	99.0	96.6	102.8	99.0	103.6
1942.....	102.7	102.6	102.9	104.9	106.6	105.1	111.0	112.8	117.1	118.8	114.3	118.1
1943.....	114.8	121.8	128.5	147.0	125.4	127.7	133.9	132.9	155.2	129.5	134.2	129.3
1944.....	139.3	153.6	141.1	134.0	136.4	153.1	141.6	142.2	138.7	137.1	151.4	144.0
1945.....	145.6	143.9	147.1	142.8	151.3	168.5	141.8	141.6	132.6	137.2	144.7	148.9

[a] Data not available.

Department Store Sales, Los Angeles

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	31	35	36	39	37	42	39	44	44	48	49	81
1920.....	53	51	55	56	52	56	51	67	57	59	64	94
1921.....	62	59	61	56	58	57	53	65	57	61	64	92
1922.....	62	57	61	63	66	60	57	71	59	74	78	113
1923.....	72	73	76	76	80	75	77	84	77	90	94	143
1924.....	92	85	82	84	84	79	74	84	79	90	91	142
1925.....	85	84	93	94	90	84	82	88	86	96	107	154
1926.....	90	86	101	94	94	90	83	98	102	101	111	180
1927.....	100	96	105	107	100	92	84	105	109	100	117	175
1928.....	100	100	99	108	98	90	88	102	108	110	110	181
1929.....	101	100	106	105	110	98	92	101	111	115	116	186
1930.....	99	97	102	103	102	93	85	94	103	101	102	160
1931.....	87	86	99	95	94	86	80	83	87	84	91	130
1932.....	68	71	75	66	68	61	59	67	73	69	60	104
1933.....	50	56	51	63	66	61	65	67	70	64	62	115
1934.....	57	62	68	63	67	58	59	69	71	75	75	125
1935.....	62	68	71	77	75	74	74	80	89	91	92	150
1936.....	73	79	88	91	90	93	88	95	108	106	103	178
1937.....	87	94	107	100	101	98	94	104	109	108	109	167
1938.....	82	82	88	96	92	90	87	96	102	106	112	170
1939.....	87	93	101	105	98	99	91	100	107	116	117	201
1940.....	95	101	111	109	112	105	104	117	127	120	133	216
1941.....	108	112	121	132	136	126	129	162	155	145	158	237
1942.....	135	135	146	141	131	124	130	145	163	166	189	276
1943.....	147	180	153	174	167	169	153	165	182	206	235	298
1944.....	165	174	195	186	189	183	172	187	208	223	280	347
1945.....	199	215	222	192	212	200	205	197	229	249	320	398

Department Store Sales, Los Angeles
(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	67.8	78.7	76.5	82.4	79.1	95.4	93.0	90.1	92.9	94.5	91.3	98.3
1920.....	106.1	105.3	107.2	108.6	102.4	116.8	111.7	126.5	110.7	107.2	109.8	105.2
1921.....	114.7	112.5	109.8	100.5	105.5	109.9	107.7	113.5	102.7	102.8	102.0	95.5
1922.....	106.4	100.8	102.1	105.2	111.9	107.8	107.8	115.6	98.9	116.2	115.9	109.4
1923.....	115.5	120.7	118.8	118.7	126.5	126.0	136.3	128.0	120.8	132.4	130.9	129.9
1924.....	138.2	131.7	120.3	122.9	124.7	124.8	122.9	120.4	116.7	124.4	119.2	121.3
1925.....	120.1	122.6	128.5	129.7	126.0	124.9	128.6	118.8	119.7	125.4	132.3	124.1
1926.....	120.2	118.5	131.9	122.5	124.4	126.7	123.1	125.1	134.4	124.7	130.0	137.5
1927.....	126.4	125.4	129.9	132.2	125.5	122.7	118.3	127.3	136.4	117.3	130.1	126.8
1928.....	120.2	124.1	116.4	126.9	116.9	114.3	117.7	117.6	128.7	122.8	116.4	125.0
1929.....	115.6	118.3	118.8	117.5	125.2	118.5	117.3	111.1	126.1	122.3	117.1	122.6
1930.....	124.2	114.6	111.1	110.9	110.8	105.3	100.5	100.3	102.3	99.5	100.4	97.2
1931.....	104.4	97.1	103.2	97.9	97.8	93.2	90.5	84.9	82.7	79.2	85.8	75.6
1932.....	78.1	76.9	74.9	65.2	67.8	63.4	64.1	65.7	66.6	62.5	54.3	58.1
1933.....	55.2	58.2	48.9	59.8	63.2	61.0	67.8	63.2	61.4	55.7	54.0	61.7
1934.....	60.5	62.1	62.7	57.5	61.7	55.8	59.3	62.6	59.9	62.8	62.9	64.6
1935.....	63.4	65.5	63.1	67.7	66.6	68.6	71.5	69.9	72.4	73.5	74.3	74.8
1936.....	71.9	73.4	75.4	77.2	77.1	83.1	82.1	80.2	84.8	82.7	80.3	85.6
1937.....	82.8	84.3	88.5	81.9	83.6	84.6	84.7	84.7	82.7	81.4	82.2	77.7
1938.....	75.4	71.1	70.4	76.0	73.7	75.2	75.8	75.7	74.9	77.2	81.7	76.5
1939.....	77.5	78.1	78.2	80.5	75.9	80.0	76.8	76.3	76.1	81.9	82.6	87.6
1940.....	76.8	79.5	83.3	82.6	85.6	84.9	87.6	89.7	89.0	83.6	81.5	94.1
1941.....	84.6	85.6	88.0	97.0	100.8	98.8	105.5	120.5	105.3	98.0	93.9	100.3
1942.....	102.6	100.1	103.2	100.5	94.3	94.5	103.2	104.7	107.6	109.0	109.1	113.4
1943.....	108.5	129.7	105.1	120.5	116.8	125.0	118.1	115.8	116.8	131.5	131.8	119.0
1944.....	118.5	121.9	130.2	125.3	128.5	131.7	129.1	127.7	129.9	138.5	152.8	134.9
1945.....	139.0	146.6	144.2	126.0	140.3	140.1	149.7	131.0	139.1	150.5	170.0	150.6

Department Store Sales, San Francisco

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	48	49	53	57	61	60	53	60	66	71	76	123
1920	74	66	74	77	88	73	65	76	79	84	85	129
1921	71	68	71	69	83	66	58	68	70	79	78	120
1922	64	58	66	69	92	68	58	71	74	88	86	140
1923	72	71	79	80	101	74	70	78	84	95	90	154
1924	78	80	79	87	92	81	70	83	86	94	98	156
1925	77	79	85	91	104	87	77	89	93	101	112	169
1926	84	88	98	94	106	93	80	98	101	110	111	184
1927	83	88	93	105	106	92	83	98	98	114	118	176
1928	90	91	95	114	101	92	86	104	105	112	117	193
1929	96	95	103	98	107	95	90	104	113	115	122	204
1930	94	99	105	111	108	98	89	104	107	107	115	183
1931	88	90	100	101	102	91	86	103	98	102	102	160
1932	78	79	81	74	74	69	62	77	77	81	77	125
1933	57	63	57	74	77	68	71	77	74	73	79	142
1934	65	68	78	76	76	70	61	81	83	85	92	156
1935	71	72	76	86	84	82	73	88	91	92	102	169
1936	74	81	89	94	93	93	88	101	102	104	111	187
1937	83	88	101	94	103	93	86	104	104	106	113	189
1938	83	80	85	97	97	91	82	97	73	78	118	183
1939	85	89	91	97	98	96	87	104	106	105	114	194
1940	82	84	99	93	96	95	89	106	108	108	126	204
1941	91	90	103	108	108	109	102	138	133	121	142	204
1942	112	114	136	131	127	123	121	144	160	168	197	272
1943	138	171	152	166	156	162	151	157	167	182	218	290
1944	145	158	181	172	172	172	171	181	199	213	272	345
1945	182	194	217	184	196	198	198	190	207	222	286	368

Department Store Sales, San Francisco

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	88.7	90.6	91.8	93.7	88.8	105.6	104.3	100.9	106.6	103.4	108.4	110.5
1920.....	129.9	115.9	121.7	120.1	121.7	122.2	121.6	121.4	121.3	116.4	115.5	110.2
1921.....	118.7	113.8	111.3	102.7	109.3	105.2	103.5	103.6	102.5	104.3	101.0	97.8
1922.....	102.1	92.6	98.6	98.0	115.8	103.5	98.8	103.2	103.5	111.1	106.5	109.1
1923.....	109.7	108.2	113.0	108.7	121.4	107.7	114.0	108.7	112.5	114.8	106.6	115.0
1924.....	113.9	117.0	108.2	113.2	106.1	113.1	109.3	110.8	110.4	108.9	111.4	111.7
1925.....	107.8	110.8	111.9	113.7	115.1	116.6	115.5	114.1	114.8	112.5	122.4	116.3
1926.....	113.2	118.7	123.9	112.8	112.8	120.0	115.6	121.0	119.9	117.9	116.7	121.8
1927.....	107.6	114.2	113.2	121.4	108.7	114.3	115.4	116.5	112.1	117.8	119.6	112.3
1928.....	112.5	113.9	111.5	127.2	99.8	110.2	115.4	119.3	115.8	111.6	114.4	118.9
1929.....	121.8	115.6	116.7	106.7	114.8	109.6	111.9	107.8	116.2	116.6	114.8	115.1
1930.....	115.1	116.5	115.0	116.9	112.0	109.3	106.9	104.3	106.4	104.9	104.7	99.9
1931.....	104.4	102.4	106.0	102.9	102.4	98.3	100.1	100.0	94.3	96.9	89.9	84.6
1932.....	89.6	87.0	83.2	73.1	71.9	72.2	69.9	72.5	71.8	74.5	65.8	64.0
1933.....	63.5	67.3	56.7	70.8	72.5	69.0	77.7	70.3	67.0	65.2	65.5	70.6
1934.....	70.2	70.5	75.4	70.6	69.6	68.9	64.8	71.9	73.0	73.7	74.1	75.2
1935.....	74.5	72.5	71.3	77.6	74.7	78.5	75.3	75.8	77.7	77.5	83.7	79.3
1936.....	75.5	79.3	81.2	82.5	80.4	86.6	88.2	84.6	84.7	85.2	84.4	85.3
1937.....	82.3	83.8	89.7	80.3	86.6	84.2	84.0	84.7	84.1	84.5	83.7	84.0
1938.....	80.2	74.2	73.4	80.6	79.5	80.2	77.9	77.0	57.4	60.6	85.2	79.2
1939.....	79.9	80.4	76.6	78.6	78.2	82.5	80.6	80.4	81.3	79.5	80.1	81.9
1940.....	74.6	72.9	76.9	75.2	78.6	78.2	77.4	84.0	80.5	78.6	76.4	92.0
1941.....	80.7	76.2	78.1	85.2	86.3	87.6	86.5	106.9	96.8	85.9	84.1	89.8
1942.....	97.0	94.3	100.6	100.9	99.1	96.5	100.2	108.8	113.7	116.5	113.9	117.0
1943.....	116.7	138.1	109.9	124.8	118.9	124.2	122.1	116.0	116.0	123.2	123.1	121.8
1944.....	119.8	124.7	127.8	126.4	128.1	128.9	135.2	130.6	135.0	141.1	150.2	141.7
1945.....	147.0	149.7	149.9	132.3	142.8	145.1	153.1	134.1	137.4	143.8	154.5	147.8

Department Store Sales, Chicago

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923.....	98.8	93.8	108.9	116.8	118.8	121.3	86.0	89.7	115.8	133.7	137.0	195.3
1924.....	104.5	96.8	102.1	121.0	112.3	116.9	80.3	84.3	112.8	119.5	140.9	200.1
1925.....	100.6	96.1	103.1	119.9	112.2	117.7	85.5	87.5	111.5	148.1	145.1	206.9
1926.....	96.3	93.1	109.8	116.2	127.8	122.5	99.5	92.2	125.3	129.8	143.5	221.2
1927.....	104.3	107.0	109.5	128.0	121.7	122.9	87.1	95.8	117.4	139.6	148.5	217.5
1928.....	109.3	105.4	111.6	124.4	128.6	127.9	95.9	96.3	134.8	141.7	152.1	236.9
1929.....	110.7	111.0	129.0	120.7	130.4	132.6	94.6	101.8	137.9	142.3	148.2	221.9
1930.....	99.7	101.1	103.4	126.3	118.3	112.5	77.3	88.5	113.6	122.4	122.2	186.9
1931.....	90.4	90.9	97.6	109.7	103.4	99.1	70.8	72.4	89.4	94.4	96.5	146.4
1932.....	69.6	68.4	74.7	80.2	78.9	73.2	50.9	54.5	76.2	78.7	77.2	108.6
1933.....	56.1	56.4	62.5	70.7	78.5	80.9	60.5	75.0	84.5	89.2	82.6	127.5
1934.....	66.3	68.5	75.3	80.3	89.1	81.5	63.2	75.2	90.9	89.9	94.7	144.8
1935.....	69.8	73.1	78.8	89.7	88.0	91.6	65.7	71.8	90.1	93.0	101.9	156.3
1936.....	72.9	79.5	90.0	98.1	106.0	99.8	75.2	83.7	102.1	111.7	121.1	177.1
1937.....	88.9	92.9	105.8	110.8	117.4	111.2	78.8	88.0	109.4	113.2	114.4	169.6
1938.....	80.9	83.7	92.6	95.7	96.8	93.7	68.9	79.3	99.5	97.9	108.0	165.6
1939.....	78.5	80.9	97.7	101.1	103.2	105.1	72.5	86.1	106.4	112.0	119.1	187.1
1940.....	86.6	87.9	96.9	102.3	108.4	111.3	76.8	94.9	114.3	112.6	131.0	194.4
1941.....	91.4	94.7	100.8	115.8	121.3	117.7	88.5	118.1	131.4	121.9	142.5	203.8
1942.....	118.3	107.1	124.3	121.4	115.7	114.1	88.8	105.7	128.1	138.8	151.8	227.1
1943.....	113.1	140.7	122.3	132.4	126.7	131.6	100.4	109.2	138.4	146.0	167.8	222.8
1944.....	116.5	114.8	137.2	141.7	144.1	138.7	118.3	125.9	154.3	168.3	197.4	260.7
1945.....	132.8	142.1	168.6	140.2	145.9	154.1	130.5	133.7	169.2	184.6	224.0	285.2

DEPARTMENT STORE SALES, CHICAGO
(Adjusted index ÷ trend, 1923–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923.....	110.7	107.5	117.3	112.0	115.2	116.0	113.5	114.0	111.7	115.9	110.7	106.4
1924.....	116.2	110.1	109.2	115.2	108.1	111.0	105.2	106.3	107.9	102.8	113.0	108.1
1925.....	111.0	108.6	109.4	113.2	107.2	110.9	111.2	109.6	105.9	126.5	115.5	110.9
1926.....	105.4	104.3	115.7	108.9	121.0	114.5	128.4	114.5	118.1	110.0	113.3	117.8
1927.....	113.3	119.0	114.4	119.1	114.4	114.0	111.6	118.1	109.9	117.5	116.4	114.9
1928.....	117.9	116.3	115.8	115.0	120.1	117.8	122.0	117.7	125.3	118.4	118.4	124.3
1929.....	118.5	121.6	132.9	110.7	120.8	121.3	119.5	123.6	127.2	118.1	114.4	115.6
1930.....	112.0	109.9	101.7	113.3	103.6	101.8	96.5	98.0	100.1	103.4	99.4	100.6
1931.....	100.9	98.0	95.3	97.7	90.0	89.0	87.7	79.5	78.2	79.2	77.9	78.2
1932.....	77.1	73.2	72.4	70.9	68.1	65.2	62.6	79.6	66.2	65.5	61.8	57.6
1933.....	61.7	60.0	60.1	62.0	67.3	71.6	73.9	81.3	72.8	73.8	65.7	67.2
1934.....	72.4	72.3	71.9	70.0	75.9	71.7	76.7	81.0	77.8	73.8	74.8	75.8
1935.....	75.7	76.7	74.8	77.7	74.5	80.0	79.2	76.8	76.6	75.8	80.0	81.2
1936.....	78.5	82.7	84.7	84.3	89.0	86.5	89.9	88.9	86.2	90.4	94.4	91.4
1937.....	95.0	96.0	99.0	94.5	97.9	95.7	93.6	92.8	91.7	91.0	88.5	86.9
1938.....	85.9	86.0	86.1	81.0	80.2	80.1	81.2	83.0	82.9	78.1	83.1	84.3
1939.....	82.8	82.5	90.2	85.1	84.9	89.2	84.9	89.6	88.0	88.8	91.0	94.6
1940.....	87.5	87.1	86.3	88.5	94.9	98.3	87.6	96.3	95.1	90.0	91.9	98.6
1941.....	91.8	93.2	89.1	99.6	105.5	103.3	100.3	119.0	108.6	96.8	99.2	102.7
1942.....	118.0	104.6	109.2	103.7	99.9	99.4	100.0	105.7	105.1	109.5	105.0	113.7
1943.....	112.0	136.4	106.7	112.4	108.7	113.9	112.3	108.5	112.9	114.4	115.3	110.8
1944.....	114.6	110.6	119.0	119.4	122.8	119.3	131.4	124.3	125.0	131.1	134.7	128.8
1945.....	129.8	136.1	145.2	117.4	123.5	131.7	144.1	131.1	136.2	142.8	151.9	139.9

DEPARTMENT STORE SALES, DETROIT

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923	63.7	69.9	80.2	95.2	86.1	83.6	57.4	77.1	90.4	94.0	92.9	125.6
1924	72.2	79.4	77.5	98.0	87.0	82.8	58.4	69.1	98.0	80.6	109.5	129.4
1925	68.2	80.8	80.6	106.9	98.0	93.8	63.4	75.1	121.4	113.3	113.8	166.7
1926	81.6	96.9	103.3	103.6	116.6	104.9	76.1	88.2	142.2	119.5	118.9	173.1
1927	80.8	98.6	104.3	117.5	111.8	108.9	80.2	102.5	144.2	118.5	135.7	193.1
1928	95.6	122.9	114.8	130.8	132.0	118.2	94.7	105.5	179.8	139.6	153.8	226.3
1929	107.0	122.2	136.3	140.8	148.0	138.7	105.0	109.6	180.4	130.4	145.4	203.6
1930	86.9	96.9	103.1	134.3	123.9	108.6	76.0	85.0	136.4	101.9	115.2	164.4
1931	73.9	88.9	97.0	114.1	105.5	93.1	67.2	69.7	111.9	81.3	90.3	137.0
1932	59.8	67.9	68.4	78.6	81.7	72.4	49.1	47.1	80.4	64.3	66.5	98.4
1933	44.3	39.1	39.3	62.1	70.1	62.9	41.4	49.6	84.5	62.6	66.3	111.2
1934	52.2	64.9	81.2	89.8	91.5	72.7	49.9	61.7	97.1	70.0	79.5	135.7
1935	63.4	74.6	86.1	92.1	89.8	78.2	57.0	66.8	111.5	85.0	100.0	152.8
1936	66.6	73.4	83.2	97.6	105.4	93.8	74.1	79.1	131.6	107.7	119.1	179.4
1937	80.4	90.8	98.9	109.6	119.4	107.7	82.6	82.7	145.3	116.6	114.4	164.9
1938	71.2	71.9	79.6	91.3	83.2	83.7	64.8	66.6	133.7	101.7	114.4	177.1
1939	74.3	77.7	96.8	107.0	104.7	100.8	73.9	76.8	152.6	111.8	118.3	191.7
1940	85.3	91.7	111.1	120.8	122.2	118.3	85.1	96.5	172.9	125.6	156.8	228.1
1941	99.5	111.5	131.3	143.3	154.6	146.1	116.4	142.0	216.0	140.5	181.2	251.6
1942	142.5	142.6	165.6	172.0	163.5	152.7	131.0	149.3	228.6	196.1	222.7	295.8
1943	147.7	186.3	160.3	192.7	168.5	167.0	145.6	158.2	192.6	203.1	230.8	267.8
1944	142.3	148.4	182.0	181.9	189.4	172.6	147.7	163.8	209.4	220.8	256.2	297.9
1945	150.4	178.3	216.3	175.3	176.7	186.4	155.1	161.5	204.2	223.2	265.2	322.9

Department Store Sales, Detroit
(Adjusted index ÷ trend, 1923–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923.....	110.3	102.1	114.1	118.9	109.2	113.3	108.0	122.5	94.5	116.4	107.2	102.5
1924.....	119.1	110.5	105.1	116.8	105.3	107.2	104.9	104.8	97.8	95.3	120.6	101.0
1925.....	107.6	107.6	104.5	121.8	113.4	116.1	108.9	108.9	115.9	128.2	120.1	124.5
1926.....	123.2	123.4	128.3	113.0	129.3	124.4	125.3	122.7	130.1	129.6	120.2	123.9
1927.....	117.0	120.5	124.3	123.0	119.0	124.0	126.7	136.9	126.7	123.5	131.8	132.8
1928.....	133.0	144.3	131.5	131.6	135.0	129.3	143.8	135.5	151.9	139.9	143.7	149.8
1929.....	143.2	138.1	150.3	136.4	145.7	146.1	153.6	135.5	146.8	125.8	130.9	129.8
1930.....	117.5	117.3	110.3	124.0	112.4	110.0	106.3	112.9	101.2	99.7	101.2	94.6
1931.....	96.1	103.8	100.1	101.6	92.4	91.0	90.8	86.2	80.1	76.8	76.7	76.2
1932.....	75.1	76.6	68.2	67.6	69.2	68.4	64.1	56.3	55.7	58.8	54.6	52.9
1933.....	53.9	42.7	37.9	51.7	57.5	57.5	52.3	57.4	56.7	55.3	52.7	57.9
1934.....	61.4	68.6	75.8	72.4	72.6	64.4	61.0	69.1	63.1	60.0	61.2	68.4
1935.....	72.3	76.4	78.0	72.0	69.0	67.1	67.6	72.6	70.2	70.6	74.7	74.7
1936.....	73.7	72.9	73.1	74.0	78.7	78.1	85.3	73.5	80.4	86.9	86.4	85.2
1937.....	86.4	87.6	84.4	80.8	86.6	87.1	92.3	84.8	86.3	91.4	80.6	76.1
1938.....	74.3	67.5	66.1	65.4	58.6	65.9	70.5	66.4	77.2	77.5	78.3	79.5
1939.....	75.5	70.9	78.2	74.5	71.8	77.1	78.1	74.5	85.7	82.9	78.8	83.7
1940.....	79.4	77.3	83.2	87.8	92.1	92.3	79.1	81.1	109.0	81.8	89.5	106.7
1941.....	90.2	91.6	95.8	101.4	113.4	111.0	105.4	116.3	132.7	89.2	100.8	114.7
1942.....	126.0	114.1	117.8	118.6	117.0	113.2	115.6	119.2	137.0	121.4	120.7	131.5
1943.....	127.3	145.4	111.2	129.7	117.6	120.8	125.4	123.2	112.6	122.6	122.1	116.1
1944.....	119.7	113.1	123.2	119.5	129.0	121.8	124.1	124.6	119.5	130.2	132.3	126.1
1945.....	123.6	132.7	143.0	112.5	117.6	128.5	127.4	120.0	113.8	128.5	133.8	133.6

Department Store Sales, Cleveland

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	58	57	64	79	73	78	63	76	83	97	105	143
1920	92	82	106	105	113	106	89	94	105	113	121	148
1921	89	82	96	97	94	85	67	69	77	94	96	131
1922	70	68	79	100	92	89	71	80	98	110	112	156
1923	82	80	106	115	105	110	80	95	113	116	123	166
1924	87	88	98	125	104	100	73	86	107	103	122	164
1925	88	85	101	122	105	100	78	89	112	123	120	171
1926	90	88	95	118	107	94	77	91	117	120	127	168
1927	88	87	94	130	104	96	81	98	115	113	123	175
1928	89	87	101	124	105	100	84	90	129	109	115	181
1929	95	94	113	127	112	112	91	107	143	123	125	189
1930	91	85	98	135	107	95	76	88	118	105	100	158
1931	82	78	95	111	92	84	73	78	108	90	92	138
1932	64	61	69	84	72	63	47	53	77	67	70	101
1933	51	46	44	82	68	65	59	75	91	76	72	119
1934	65	62	83	93	88	79	64	74	96	82	83	138
1935	76	57	76	103	79	83	66	75	103	87	93	149
1936	76	71	88	110	99	95	81	88	119	109	115	174
1937	92	84	103	125	111	104	89	95	136	114	107	162
1938	83	73	84	114	84	82	73	77	115	95	102	163
1939	80	73	94	118	98	95	79	88	126	111	113	188
1940	87	79	97	118	106	109	83	104	141	113	130	201
1941	96	93	115	155	127	124	111	155	181	128	156	232
1942	143	121	159	171	131	126	108	138	185	160	187	253
1943	136	157	150	162	151	151	126	146	163	177	213	245
1944	129	128	163	162	170	150	139	155	183	191	230	285
1945	142	153	203	162	165	174	155	153	185	211	243	305

Department Store Sales, Cleveland

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	86.4	87.5	85.1	88.8	90.0	101.4	103.9	108.8	99.6	109.0	112.2	112.2
1920.....	133.3	122.3	137.2	114.9	135.7	134.1	143.0	130.8	122.6	123.5	125.8	113.1
1921.....	125.6	119.2	121.0	103.3	109.9	104.7	104.9	93.6	87.6	100.1	97.2	97.5
1922.....	96.1	96.2	97.0	103.9	104.9	106.8	108.3	105.8	108.7	114.3	110.6	113.2
1923.....	109.8	110.4	126.9	116.3	116.6	128.8	119.0	122.5	122.2	117.5	118.4	117.2
1924.....	113.8	118.5	114.6	123.4	112.8	114.1	105.9	108.2	113.0	101.8	114.7	113.2
1925.....	112.2	111.7	115.2	117.7	111.2	111.5	110.5	109.3	115.5	118.7	110.0	115.4
1926.....	112.2	113.0	105.9	111.2	110.6	102.4	106.5	109.2	117.8	113.2	113.9	110.7
1927.....	107.1	109.0	102.4	119.7	105.1	102.2	109.5	114.9	113.2	104.1	107.9	112.8
1928.....	108.4	114.2	108.8	106.1	106.6	106.9	107.6	103.6	107.7	105.0	108.1	109.1
1929.....	113.1	120.7	119.2	106.4	111.3	116.8	113.9	120.5	116.9	116.0	115.0	111.5
1930.....	106.1	106.7	101.0	110.6	104.2	97.2	93.2	97.1	94.4	96.8	90.0	91.2
1931.....	93.7	96.0	96.0	89.1	87.6	84.1	87.6	84.3	84.7	81.4	81.1	78.1
1932.....	71.5	73.5	68.3	66.0	67.3	61.8	55.3	50.2	59.0	59.3	60.5	56.0
1933.....	55.9	54.3	42.7	63.2	62.2	62.5	68.0	77.8	68.5	66.0	61.0	64.6
1934.....	69.9	71.7	78.9	70.2	78.9	74.5	72.3	75.3	70.8	69.8	69.0	73.6
1935.....	80.1	64.7	70.9	76.3	69.5	76.8	73.2	74.8	74.5	72.6	75.8	77.9
1936.....	78.6	79.1	80.6	79.9	85.5	86.2	88.1	86.2	84.5	89.4	92.0	89.3
1937.....	93.3	91.8	92.5	89.4	94.1	92.7	95.1	91.3	94.8	91.7	84.0	81.6
1938.....	82.7	78.4	74.1	79.9	69.9	71.7	76.6	72.7	78.7	75.1	78.7	80.7
1939.....	78.2	77.0	81.4	81.2	80.1	81.6	81.4	81.6	84.7	86.1	85.7	91.4
1940.....	84.8	78.2	78.5	88.1	88.9	93.1	83.4	90.2	98.7	84.8	84.4	99.8
1941.....	91.9	90.5	91.5	113.8	104.8	104.1	109.5	132.1	124.5	94.4	99.5	113.3
1942.....	134.5	115.7	124.3	123.4	106.3	104.1	104.8	115.7	125.1	115.9	117.3	121.4
1943.....	125.9	147.7	115.4	115.0	120.4	122.6	120.2	120.4	108.4	126.2	131.4	115.7
1944.....	117.4	118.4	123.2	113.1	133.4	119.9	130.5	125.7	119.7	133.9	139.6	132.4
1945.....	127.2	139.2	151.0	111.3	127.3	136.7	143.3	122.1	119.1	145.7	145.1	139.4

Department Store Sales, Pittsburgh

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919	86	88	94	108	105	111	88	89	102	111	133	169
1920	116	105	128	127	144	142	111	115	134	148	169	208
1921	145	127	134	132	141	129	89	85	98	125	123	170
1922	97	96	103	131	130	122	90	91	114	138	144	202
1923	112	119	139	142	154	150	104	112	133	155	155	215
1924	122	133	124	151	147	148	98	104	126	137	160	211
1925	116	132	127	145	151	139	101	101	115	156	150	218
1926	120	125	122	131	156	140	100	107	122	152	151	221
1927	114	120	117	143	147	133	99	105	117	139	140	212
1928	115	110	113	125	134	130	94	91	127	126	139	212
1929	103	115	124	122	140	140	91	101	124	146	143	223
1930	93	113	107	139	142	129	88	97	116	134	130	189
1931	88	100	104	123	123	112	77	85	87	101	99	149
1932	66	76	73	84	87	77	49	51	64	76	70	105
1933	49	57	50	77	77	76	51	73	76	81	76	121
1934	56	69	76	82	96	87	54	68	76	84	85	133
1935	56	72	76	88	93	95	59	70	86	93	95	147
1936	62	84	61	107	120	109	70	87	101	119	120	178
1937	78	109	112	114	134	124	77	97	118	126	113	175
1938	74	90	84	101	97	93	63	74	94	100	103	166
1939	70	90	91	101	108	100	64	81	104	114	126	186
1940	76	94	97	102	119	119	72	100	119	116	131	199
1941	80	108	108	128	138	131	89	143	142	128	156	218
1942	121	127	138	142	137	126	88	124	141	151	168	229
1943	117	146	129	146	142	139	100	127	146	162	188	235
1944	118	120	156	158	167	144	120	142	172	185	223	262
1945	129	150	195	155	163	172	138	151	183	212	255	303

Department Store Sales, Pittsburgh

(Adjusted index ÷ trend, 1919–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1919.....	83.9	84.1	86.6	89.7	82.1	92.0	101.9	99.9	96.2	88.7	102.4	92.1
1920.....	112.9	100.1	117.7	105.3	112.4	117.3	128.2	128.8	126.3	118.2	129.8	113.1
1921.....	140.8	120.9	123.0	109.2	109.8	106.4	102.6	95.1	92.1	99.5	94.3	92.3
1922.....	94.0	91.2	94.3	108.2	101.0	100.4	103.6	101.5	107.0	109.7	110.2	109.4
1923.....	108.3	112.8	127.1	117.0	119.4	123.1	119.4	124.7	124.5	122.9	118.4	116.3
1924.....	117.8	125.7	113.0	124.1	113.8	121.3	112.3	115.6	117.7	108.5	122.0	113.8
1925.....	111.7	124.6	115.6	119.0	116.7	113.7	115.5	112.0	107.3	123.3	114.1	117.4
1926.....	115.3	117.7	110.9	107.2	120.2	114.3	114.2	118.5	113.5	119.8	114.6	118.8
1927.....	109.4	112.8	106.1	116.9	113.1	108.4	112.7	116.0	108.7	109.3	106.1	113.7
1928.....	110.1	103.2	102.3	102.0	102.9	105.7	106.9	100.3	117.7	98.9	105.0	113.5
1929.....	119.6	107.7	116.9	96.8	104.4	111.1	111.1	103.9	106.9	112.8	111.8	113.5
1930.....	107.7	106.2	100.8	110.2	105.7	102.2	107.2	99.7	99.9	103.3	101.4	95.9
1931.....	101.8	93.8	97.7	97.2	91.3	88.6	93.6	87.2	74.8	77.8	77.1	75.5
1932.....	76.1	71.1	68.4	66.3	64.5	60.7	59.4	52.2	54.9	58.4	54.4	53.0
1933.....	56.4	53.2	46.8	60.6	57.0	59.8	61.7	74.6	65.1	62.1	58.9	61.1
1934.....	64.4	64.3	71.0	64.4	71.0	68.4	65.2	69.3	65.0	64.3	65.8	67.0
1935.....	64.2	67.0	70.9	69.0	68.5	74.4	71.1	71.2	73.4	71.0	73.4	73.9
1936.....	71.0	78.0	56.7	83.7	88.3	85.3	84.2	88.3	85.9	90.7	92.5	89.3
1937.....	89.0	101.0	104.0	89.1	98.4	96.8	92.4	98.3	100.2	95.8	86.9	87.6
1938.....	84.4	83.2	77.9	78.7	71.1	72.5	75.5	74.8	79.6	75.8	79.1	82.9
1939.....	79.7	83.0	84.2	78.6	79.0	77.8	76.5	81.7	87.9	86.4	96.6	92.7
1940.....	81.4	86.8	83.5	84.3	95.2	102.3	86.2	93.6	95.8	89.0	88.5	103.5
1941.....	85.6	99.5	92.7	105.6	110.3	112.4	106.4	133.5	114.1	98.0	105.1	113.2
1942.....	129.1	116.7	118.4	117.0	109.3	107.8	105.0	115.6	113.1	115.4	113.0	118.7
1943.....	124.6	134.0	110.4	120.0	113.0	118.8	119.1	118.2	116.8	123.5	126.2	121.6
1944.....	125.5	109.8	133.3	129.6	132.7	122.8	142.5	131.8	137.4	140.9	149.5	135.2
1945.....	136.9	137.1	166.2	126.9	129.2	146.4	163.7	140.0	145.9	161.0	170.5	156.1

INDUSTRIAL AND COMMERCIAL POWER SALES, LOS ANGELES

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1927	52.4	49.8	54.3	62.0	64.0	56.8	64.2	66.3	65.7	69.9	65.0	62.6
1928	61.6	61.3	67.2	68.5	68.5	70.0	77.5	75.6	73.0	76.2	74.1	69.3
1929	68.1	68.3	73.0	80.8	83.9	84.7	86.6	93.3	90.8	90.4	83.9	74.4
1930	71.2	71.1	72.0	78.5	81.1	84.1	86.5	88.2	83.3	80.2	74.4	70.0
1931	66.1	64.0	68.6	72.6	73.1	74.6	81.3	82.7	74.3	70.1	62.6	56.5
1932	54.7	54.0	56.8	61.6	61.5	66.7	65.5	67.7	61.8	66.2	58.0	53.7
1933	50.4	48.9	50.7	54.1	62.3	69.1	75.4	80.6	76.5	73.1	71.2	64.5
1934	62.7	62.2	64.2	70.9	73.2	74.6	76.5	75.2	79.0	75.5	69.5	67.5
1935	67.4	68.4	72.2	77.7	81.7	83.0	85.8	89.6	91.2	87.5	87.0	83.6
1936	83.3	82.4	84.1	91.8	97.3	102.1	106.6	110.2	109.8	109.6	102.9	103.0
1937	96.6	96.2	99.4	101.1	103.9	107.0	120.9	120.0	118.9	120.4	113.5	105.5
1938	98.2	92.7	91.4	96.0	103.5	106.7	109.8	111.1	111.4	113.8	107.7	102.8
1939	97.6	95.9	96.6	97.1	104.6	107.0	112.7	118.2	117.8	119.7	117.5	108.5
1940	102.3	102.9	103.3	109.4	116.4	119.9	122.2	124.2	127.2	125.7	124.5	119.5
1941	119.2	122.4	124.8	129.3	138.9	149.4	152.9	158.2	158.6	159.0	164.0	158.3
1942	157.9	162.1	164.2	167.6	174.2	180.6	189.8	216.0	222.6	219.1	220.4	216.0
1943	213.8	213.7	221.2	231.5	230.8	230.6	251.8	251.9	270.9	268.7	264.6	264.8
1944	253.4	270.7	264.3	273.9	278.4	285.6	281.9	293.4	295.3	288.3	295.9	284.5
1945	288.2	297.9	279.8	299.2	288.7	296.7	286.3	293.8	264.6	234.3	233.2	234.2

INDUSTRIAL AND COMMERCIAL POWER SALES, LOS ANGELES
(Adjusted index ÷ trend, 1927–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1927.....	329.8	300.5	298.0	299.0	290.8	237.6	248.9	241.2	240.9	249.0	241.5	242.7
1928.....	242.1	235.1	238.3	217.0	207.4	197.0	204.6	190.4	187.3	191.9	196.3	193.6
1929.....	194.5	191.9	190.9	189.9	189.7	180.0	173.8	179.7	179.0	176.1	172.9	162.0
1930.....	159.3	157.3	149.3	147.0	146.8	143.5	140.1	137.6	133.6	127.2	125.3	125.3
1931.....	121.8	117.1	117.9	113.0	110.2	106.3	110.1	108.2	100.1	93.9	89.1	85.7
1932.....	85.7	84.1	83.4	81.9	79.5	81.5	76.3	76.4	71.9	76.6	71.6	70.7
1933.....	68.7	66.3	64.8	62.8	70.3	74.0	77.1	79.9	78.3	74.6	77.5	75.0
1934.....	75.5	74.7	72.8	73.2	73.5	71.1	69.7	64.4	72.2	68.9	67.7	70.3
1935.....	68.2	69.1	72.1	74.8	75.3	74.3	74.1	74.6	75.7	73.5	74.3	74.2
1936.....	76.3	75.5	76.2	80.1	81.5	83.1	83.8	83.6	83.1	84.0	80.2	83.5
1937.....	80.8	80.6	82.4	80.9	79.8	79.9	87.3	83.6	82.7	84.8	81.4	78.7
1938.....	75.7	71.6	70.0	70.9	73.4	73.6	73.2	71.5	71.6	74.2	71.5	71.1
1939.....	69.8	68.7	68.5	66.4	68.8	68.5	69.9	70.8	70.5	72.6	72.6	69.9
1940.....	68.1	68.7	68.3	69.9	71.5	71.7	70.8	69.5	71.1	71.4	71.9	72.0
1941.....	74.3	76.5	77.4	77.4	80.0	83.8	83.1	83.0	83.2	84.7	89.1	89.7
1942.....	92.5	95.3	95.8	94.4	94.5	95.3	97.1	106.8	110.1	110.0	112.9	115.4
1943.....	118.1	118.6	121.7	123.1	118.1	115.0	121.7	117.8	126.7	127.6	128.2	133.9
1944.....	132.5	142.1	137.7	137.9	135.0	135.0	129.1	130.1	131.0	129.8	135.9	136.4
1945.....	143.0	148.5	138.5	143.1	133.0	133.3	124.6	123.8	111.6	100.4	101.9	106.9

Industrial and Commercial Power Sales, San Francisco

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1921	44	43	38	38	36	35	33	35	37	37	41	44
1922	45	42	41	42	40	41	41	43	44	46	50	53
1923	55	51	49	48	46	46	44	46	45	48	51	53
1924	55	51	50	50	47	47	47	48	50	56	57	59
1925	64	60	57	55	56	51	54	55	55	60	63	65
1926	69	63	61	61	56	57	56	57	61	62	67	70
1927	77	70	67	67	63	62	59	63	66	67	72	77
1928	81	77	73	72	69	70	66	69	70	73	80	82
1929	87	82	80	79	76	77	71	73	79	80	86	93
1930	96	89	84	82	77	82	73	79	84	77	87	94
1931	103	93	85	84	83	81	80	80	82	83	90	95
1932	105	92	83	85	78	74	72	72	76	82	85	85
1933	95	82	76	77	78	77	75	73	81	79	85	88
1934	95	86	81	83	82	79	77	74	86	81	91	94
1935	100	91	86	84	85	82	80	83	91	86	95	99
1936	104	96	91	94	92	85	87	91	96	106	104	105
1937	116	105	104	105	99	92	95	93	95	99	103	108
1938	109	108	102	105	93	93	95	92	101	101	104	113
1939	122	109	117	116	104	109	109	108	113	115	118	118
1940	123	122	108	107	109	113	110	114	122	108	116	131
1941	136	125	119	116	118	111	110	113	120	116	133	136
1942	144	148	125	130	128	116	121	123	132	132	150	144
1943	148.0	148.4	149.2	145.2	141.6	134.6	135.1	143.2	144.9	151.9	155.7	180.2
1944	182.6	175.0	169.2	165.0	156.4	157.9	158.0	155.9	163.9	162.5	184.5	191.8
1945	208.5	195.9	192.0	185.6	182.9	180.6	174.3	176.2	171.8	176.7	183.9	193.7

INDUSTRIAL AND COMMERCIAL POWER SALES, SAN FRANCISCO
(Adjusted index + trend, 1921–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1921.....	119.2	124.2	113.9	113.7	111.2	109.3	104.3	107.7	107.9	105.8	108.5	110.6
1922.....	105.9	105.9	107.4	109.9	108.3	112.3	113.9	116.3	113.2	116.0	116.8	117.8
1923.....	114.8	113.9	113.8	111.6	110.6	112.3	109.0	111.2	103.3	108.4	106.5	105.4
1924.....	102.8	102.1	104.2	104.4	101.7	103.1	104.7	104.4	103.6	114.1	107.9	106.3
1925.....	108.3	109.0	107.8	104.4	110.2	101.9	109.6	109.2	104.0	111.6	108.8	107.1
1926.....	106.9	104.8	105.8	106.1	101.0	104.5	104.4	104.1	106.0	106.2	106.6	106.3
1927.....	110.0	107.1	107.1	107.4	104.8	104.9	101.6	106.1	106.0	106.0	106.0	108.1
1928.....	107.1	109.3	108.2	107.1	106.6	110.0	105.7	108.1	104.6	107.5	109.6	107.2
1929.....	107.3	108.6	110.7	109.8	109.7	113.0	106.3	106.9	110.5	110.1	110.3	113.9
1930.....	110.8	110.4	108.9	106.9	104.0	112.9	102.3	108.5	110.3	99.6	104.8	108.1
1931.....	111.7	108.4	103.6	102.9	105.6	105.0	105.7	103.6	101.4	101.2	102.2	103.1
1932.....	107.5	101.3	95.5	98.4	93.8	90.6	90.0	88.2	88.9	94.6	91.4	87.3
1933.....	92.5	85.4	82.9	84.5	88.9	89.4	88.8	84.6	89.7	86.4	86.6	85.7
1934.....	87.3	85.0	83.8	86.4	88.7	87.1	86.6	81.6	90.6	84.3	88.2	87.1
1935.....	87.5	85.6	84.7	83.3	87.6	86.2	85.7	87.2	91.5	85.3	87.9	87.5
1936.....	86.8	86.3	85.6	89.0	90.5	85.3	89.1	91.4	92.2	100.4	91.8	88.7
1937.....	92.5	90.2	93.5	94.9	93.2	88.3	93.0	89.3	87.3	89.8	87.1	87.4
1938.....	83.3	88.9	87.8	91.0	83.9	85.6	89.2	84.8	89.0	87.9	84.4	87.7
1939.....	89.4	86.0	96.8	96.5	90.1	96.3	98.3	95.6	95.7	96.2	92.0	88.1
1940.....	86.7	92.5	85.7	85.6	90.7	96.0	95.3	97.0	99.3	86.8	87.0	94.0
1941.....	92.2	91.3	91.1	89.3	94.6	90.8	91.9	92.6	94.2	89.9	96.2	94.1
1942.....	94.2	104.3	92.2	96.6	99.0	91.5	97.5	97.3	99.9	91.4	104.6	96.2
1943.....	93.4	100.9	106.2	104.2	105.6	102.5	105.0	109.3	105.9	109.7	104.9	116.2
1944.....	111.3	115.0	116.4	114.3	112.8	116.3	118.8	115.2	115.8	113.5	120.2	119.7
1945.....	123.0	124.5	127.9	124.5	127.7	128.8	126.9	126.0	117.6	119.5	116.1	117.1

INDUSTRIAL AND COMMERCIAL POWER SALES, CHICAGO

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920	24	25	27	27	27	30	31	33	30	28	27	25
1921	24	22	23	25	27	30	31	32	32	30	26	28
1922	27	27	29	31	35	39	40	41	41	40	37	36
1923	36	36	39	40	43	46	47	51	46	46	42	43
1924	41	42	44	46	46	47	48	49	50	49	46	47
1925	46	47	48	51	52	60	60	63	62	59	58	57
1926	55	57	58	58	62	67	69	73	74	70	64	64
1927	63	62	65	68	71	74	78	77	78	78	73	70
1928	68	73	74	76	79	83	89	89	89	89	85	84
1929	84	85	87	90	96	95	100	104	101	99	91	88
1930	88	86	87	87	95	92	92	92	93	89	81	81
1931	80	81	80	81	84	87	91	89	86	83	74	77
1932	71	72	69	67	69	71	72	70	69	68	65	62
1933	62	62	60	63	70	79	86	84	83	78	74	70
1934	72	72	72	77	79	85	86	80	80	79	77	76
1935	79	81	79	86	86	83	89	94	90	91	87	90
1936	88	89	92	91	95	98	105	107	107	105	102	104
1937	102	104	110	108	110	111	113	120	116	110	102	98
1938	95	92	93	89	91	93	95	105	100	99	100	101
1939	101	100	105	99	102	109	110	117	115	123	120	116
1940	119	117	111	113	116	116	123	130	126	131	127	133
1941	132	130	131	137	141	144	150	154	152	153	149	156
1942	153	152	154	155	155	161	165	171	167	167	170	175
1943	171	174	188	191	190	201	206	216	212	208	217	215
1944	212	216	219	214	220	222	222	233	220	222	221	219
1945	222	221	225	217	225	220	217	210	183	183	179	182

INDUSTRIAL AND COMMERCIAL POWER SALES, CHICAGO
(Adjusted index ÷ trend, 1920–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920.....	186.6	187.2	190.2	179.7	165.6	166.7	162.6	164.8	150.0	142.3	144.1	132.0
1921.....	129.3	115.7	114.8	119.0	122.7	121.2	119.4	118.2	119.0	114.3	104.7	112.5
1922.....	111.2	109.5	111.8	114.8	121.1	124.1	121.7	120.0	121.6	121.9	120.3	116.9
1923.....	119.9	118.5	123.2	121.3	122.2	120.4	118.5	123.6	113.4	116.9	114.1	117.0
1924.....	114.7	116.5	117.3	118.0	110.8	104.5	103.1	101.6	105.5	106.8	107.2	110.0
1925.....	110.9	112.6	110.7	113.6	108.6	116.1	112.3	114.2	114.2	112.5	118.5	117.3
1926.....	116.5	120.2	117.7	114.0	114.4	114.7	114.3	117.3	121.0	118.5	116.3	117.3
1927.....	119.2	116.7	118.0	119.6	117.4	113.6	116.0	111.1	114.9	118.9	119.5	115.6
1928.....	116.3	124.1	121.5	120.9	118.5	115.5	120.1	116.6	119.1	123.4	126.6	126.3
1929.....	125.7	125.4	127.3	128.5	131.0	125.2	126.8	129.7	127.5	127.4	123.9	120.1
1930.....	120.9	116.6	117.0	114.2	119.3	111.8	107.5	105.7	108.4	105.7	101.8	102.0
1931.....	101.6	101.7	99.5	98.5	97.8	97.9	98.6	94.8	92.9	91.5	86.5	90.2
1932.....	83.8	84.0	80.0	75.8	74.8	74.4	72.7	69.6	69.5	70.0	70.9	67.9
1933.....	68.4	67.7	65.1	66.7	71.0	77.6	81.4	78.3	78.4	75.3	75.8	71.9
1934.....	74.6	73.7	73.3	76.5	75.3	78.5	76.6	70.2	71.0	71.8	74.2	73.5
1935.....	77.1	78.2	75.8	80.7	77.3	72.3	74.8	77.8	75.6	78.0	79.3	82.2
1936.....	81.1	81.2	83.4	80.8	80.8	80.8	83.5	83.9	85.1	85.3	88.0	90.1
1937.....	89.3	90.0	94.7	91.0	88.9	86.8	85.3	89.3	87.0	84.9	83.6	80.7
1938.....	75.6	73.6	73.3	70.9	71.7	71.4	71.6	76.0	74.9	74.3	75.4	75.5
1939.....	76.5	76.3	78.9	75.1	76.7	79.8	79.1	80.9	82.2	88.2	86.5	82.8
1940.....	86.1	85.3	79.7	81.9	83.3	81.2	84.6	85.9	86.2	89.8	87.5	90.9
1941.....	91.4	90.7	90.0	95.1	97.0	96.5	98.7	97.5	99.6	100.5	98.4	102.2
1942.....	101.6	101.6	101.6	103.2	102.3	103.5	104.3	103.9	105.0	105.3	107.9	110.0
1943.....	109.1	111.7	119.1	122.2	120.4	124.2	125.2	126.2	128.2	126.2	132.4	130.1
1944.....	130.0	133.4	133.5	131.8	134.2	132.1	129.8	131.1	128.1	129.6	129.8	127.6
1945.....	131.1	131.5	132.2	128.8	132.3	126.1	118.2	113.9	102.7	103.1	101.4	102.3

INDUSTRIAL AND COMMERCIAL POWER SALES, DETROIT

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920	28.2	28.7	34.9	22.8	26.1	33.8	30.3	30.1	27.5	21.8	19.6	15.0
1921	9.1	10.2	15.7	21.1	21.2	22.3	22.5	26.3	24.2	24.6	22.0	17.4
1922	17.7	19.8	23.8	24.0	29.4	31.4	30.7	36.2	32.4	33.8	32.0	28.8
1923	36.4	33.4	39.1	39.3	40.3	37.6	38.2	40.7	37.0	43.8	40.2	37.3
1924	46.7	46.9	48.9	43.8	37.2	34.3	36.5	37.5	38.5	40.5	35.6	37.5
1925	42.2	39.0	47.5	47.5	49.7	53.3	54.1	57.5	56.8	61.1	55.5	54.4
1926	58.1	60.0	69.9	63.6	61.2	68.0	63.8	75.7	70.2	67.1	55.9	53.3
1927	60.4	61.6	71.7	66.6	71.1	68.9	61.9	75.7	67.0	62.8	58.0	64.2
1928	68.7	68.3	71.1	73.4	76.3	74.4	80.0	82.9	89.5	87.1	85.2	79.1
1929	91.8	95.1	93.2	97.0	96.5	91.8	93.7	92.7	90.4	78.6	65.9	64.0
1930	75.3	77.7	73.9	77.2	74.9	73.4	49.9	57.0	60.3	60.5	57.4	53.7
1931	56.5	65.9	69.2	69.9	69.7	61.9	57.4	51.8	53.7	43.8	50.4	56.5
1932	62.1	60.3	57.0	56.5	65.2	61.7	53.7	34.4	37.2	51.3	45.9	47.6
1933	50.4	47.6	38.4	53.9	60.7	66.6	69.2	64.5	62.1	51.3	47.1	55.6
1934	76.7	86.6	88.5	93.2	84.3	79.1	70.6	64.0	59.3	51.3	60.3	81.4
1935	100.3	101.2	99.8	98.9	89.5	82.4	80.0	75.3	85.2	91.8	98.4	103.1
1936	103.6	89.0	101.2	109.7	109.2	105.5	109.2	96.5	101.7	105.0	129.0	124.3
1937	130.4	128.1	113.9	122.9	125.7	120.5	112.5	106.4	111.1	119.1	108.3	92.7
1938	71.6	69.2	67.8	65.9	67.3	60.7	61.2	67.3	88.0	93.7	109.7	112.0
1939	115.3	104.5	99.3	103.1	88.5	92.7	92.3	95.6	116.3	118.6	121.9	136.1
1940	137.0	131.8	121.5	120.1	119.6	114.4	102.6	117.2	136.5	139.8	153.0	150.7
1941	153.9	161.5	158.7	136.0	161.5	162.4	146.9	147.8	153.9	151.1	164.8	150.7
1942	152.1	148.3	145.5	141.2	143.6	148.3	153.9	155.4	165.2	161.0	181.3	175.6
1943	185.0	182.2	182.7	184.1	186.9	187.4	183.1	191.6	191.6	194.0	202.0	189.3
1944	200.1	195.8	194.0	197.3	198.7	189.3	189.3	188.8	192.1	187.8	192.5	192.1
1945	200.5	194.8	185.7	188.3	167.0	168.5	159.6	140.7	126.2	127.1	145.9	140.3

INDUSTRIAL AND COMMERCIAL POWER SALES, DETROIT
(Adjusted index ÷ trend, 1920–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920.....	272.5	264.9	284.0	177.4	193.0	241.0	215.8	191.0	177.9	139.0	134.0	106.7
1921.....	56.8	61.5	84.9	110.9	106.9	109.8	112.1	117.6	111.5	113.1	109.1	91.1
1922.....	81.2	89.3	96.6	95.5	112.9	118.6	117.8	125.9	116.4	121.6	125.2	119.1
1923.....	133.0	119.8	127.2	125.1	124.7	114.7	118.9	115.2	108.8	129.4	129.3	127.1
1924.....	141.1	139.4	132.1	116.5	96.7	88.2	95.8	89.8	95.9	101.5	97.5	109.2
1925.....	109.1	99.5	110.3	108.5	111.0	118.1	122.4	119.0	122.6	133.0	132.2	137.7
1926.....	130.8	133.7	141.9	127.4	119.7	132.1	127.0	137.8	133.8	129.2	117.8	119.6
1927.....	120.7	122.0	129.5	118.9	124.2	119.6	110.1	123.4	114.1	108.2	109.5	129.3
1928.....	123.4	121.5	115.4	117.8	120.0	116.4	128.4	122.1	137.9	135.7	145.8	144.3
1929.....	149.6	153.8	137.7	141.8	138.4	131.0	137.3	124.6	127.3	112.0	103.2	107.0
1930.....	112.3	115.1	100.0	103.5	98.5	96.2	67.2	70.4	78.0	79.3	82.8	82.6
1931.....	70.7	82.2	86.6	83.5	81.5	76.2	75.2	75.3	70.6	58.8	63.3	67.4
1932.....	72.2	69.8	66.2	62.8	70.9	70.6	65.3	46.6	45.6	64.1	53.7	52.9
1933.....	54.6	51.4	41.6	55.8	61.6	71.2	78.7	81.7	71.2	60.0	51.6	57.9
1934.....	77.9	87.8	90.9	90.7	80.3	79.3	75.4	76.1	63.9	56.4	62.0	79.7
1935.....	95.7	96.4	95.5	90.6	80.3	77.8	80.5	84.4	86.5	95.1	95.4	95.3
1936.....	93.4	80.1	91.5	94.9	92.6	94.2	103.9	102.3	97.6	103.0	118.5	108.7
1937.....	111.3	109.2	97.5	100.7	101.0	102.0	101.5	106.9	101.2	110.8	94.4	76.9
1938.....	58.0	56.0	55.1	51.3	51.4	48.8	52.5	64.4	76.2	83.0	91.1	88.5
1939.....	87.1	80.4	79.2	83.8	70.2	75.8	77.7	79.2	89.4	92.5	89.2	102.9
1940.....	98.7	96.8	92.5	93.2	92.7	89.2	82.4	92.7	101.2	104.2	107.0	109.0
1941.....	106.0	113.4	115.6	101.0	119.8	121.2	113.0	111.9	109.1	107.9	110.4	104.4
1942.....	100.4	99.8	101.5	100.5	102.1	106.2	113.5	112.8	112.4	110.2	116.5	116.8
1943.....	117.2	117.7	122.4	125.8	127.6	128.9	129.8	133.6	125.3	127.7	124.7	121.0
1944.....	121.8	121.6	125.0	129.7	130.5	125.2	129.1	126.7	120.8	118.9	114.4	118.1
1945.....	117.5	116.5	115.2	119.2	105.6	107.4	104.9	91.0	76.5	77.6	83.6	83.2

INDUSTRIAL AND COMMERCIAL POWER SALES, CLEVELAND

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920	42.8	59.0	47.0	43.9	38.4	36.3	50.3	54.5	38.4	41.7	38.0	31.4
1921	29.4	30.1	29.6	29.4	28.3	31.0	28.0	27.7	33.1	30.4	28.5	31.1
1922	29.2	31.5	36.7	36.0	38.9	40.4	37.8	39.9	41.4	43.5	44.2	45.4
1923	45.7	46.9	49.9	50.6	50.6	51.4	48.7	45.5	47.8	48.2	46.9	47.8
1924	47.3	52.8	52.9	49.7	48.1	43.4	40.6	43.8	45.7	46.7	50.3	49.8
1925	49.3	53.9	53.8	52.2	55.2	53.9	52.0	55.8	55.6	62.1	60.7	59.7
1926	58.2	62.2	61.4	62.6	60.3	58.5	57.4	61.3	62.3	66.4	62.2	59.3
1927	58.2	63.6	65.7	66.0	68.0	65.9	62.3	64.8	63.6	65.7	62.1	64.9
1928	63.0	71.6	69.5	70.7	71.2	71.3	72.6	78.7	76.6	80.7	79.6	74.9
1929	79.7	87.1	84.0	91.4	87.1	84.4	88.2	91.1	85.7	88.8	79.4	75.1
1930	75.0	79.8	77.6	78.2	78.9	78.3	71.6	69.6	69.1	72.5	68.3	66.9
1931	64.5	67.8	70.9	72.4	70.9	68.8	68.5	66.2	67.1	67.1	63.1	63.0
1932	61.4	64.5	59.6	56.8	55.6	60.8	51.7	50.9	53.6	55.3	56.9	58.7
1933	50.6	55.5	50.0	52.5	60.0	66.8	70.1	74.5	74.2	71.7	70.7	71.7
1934	72.8	79.3	79.6	86.2	82.8	78.4	76.7	73.8	68.1	72.0	66.6	72.9
1935	80.5	83.7	92.2	85.4	86.5	77.6	79.6	88.0	84.1	95.0	98.4	101.5
1936	94.1	87.2	96.9	96.6	101.1	97.1	101.4	103.9	101.2	112.1	110.2	114.8
1937	105.0	102.6	116.4	112.2	116.9	104.8	107.5	111.0	105.9	112.7	98.8	90.7
1938	81.5	76.2	81.6	80.0	82.0	73.6	81.1	88.4	95.9	107.2	105.7	110.4
1939	102.2	99.2	109.3	105.0	102.8	103.7	101.6	116.1	122.4	136.8	138.0	145.7
1940	130.2	123.0	129.2	117.2	129.1	128.9	124.0	143.5	139.8	149.5	154.0	165.1
1941	154.0	150.4	173.0	163.3	177.6	169.9	170.8	180.3	169.8	188.1	178.2	184.0
1942	176.8	170.5	185.7	183.4	188.3	180.8	191.7	199.6	196.3	232.7	234.4	250.3
1943	246.5	242.7	277.0	270.7	285.3	276.0	310.6	330.7	349.6	391.2	393.1	393.7
1944	374.9	372.5	395.9	379.6	383.7	366.9	375.3	395.2	372.1	388.4	371.4	378.0
1945	353.7	349.5	389.8	372.2	392.6	359.9	352.0	332.0	246.9	240.4	222.5	215.0

INDUSTRIAL AND COMMERCIAL POWER SALES, CLEVELAND

(Adjusted index ÷ trend, 1920–1945[a])

Year	January	February	March	April	May	June	July	August	September	October	November	December
1922.....	.....	.....	.....	.....	.....	.....	380.4	360.9	355.1	331.0	325.2	316.1
1923.....	315.2	300.0	292.2	286.9	272.7	271.7	251.3	218.4	224.7	206.3	200.9	198.3
1924.....	198.4	209.8	196.2	181.6	169.3	152.1	140.9	143.1	148.1	139.6	152.0	147.2
1925.....	148.7	155.2	145.7	140.4	144.3	141.3	135.9	138.4	137.4	142.3	141.5	137.1
1926.....	137.1	140.7	131.2	133.5	125.3	122.6	120.2	122.3	124.5	123.7	118.2	111.3
1927.....	112.4	118.3	115.9	116.3	117.3	115.0	110.4	110.8	103.0	106.5	98.7	104.5
1928.....	101.8	110.6	107.8	102.7	106.0	105.0	110.4	115.8	107.0	113.0	109.3	104.4
1929.....	111.6	116.9	113.4	115.7	113.2	108.8	117.5	117.5	105.1	109.4	96.1	92.3
1930.....	94.0	96.9	89.7	90.9	90.1	90.9	83.7	78.1	78.0	77.0	74.5	72.5
1931.....	72.4	73.8	73.6	75.6	72.9	71.9	72.1	66.9	68.3	64.3	62.2	61.7
1932.....	62.4	63.6	55.8	53.8	51.9	57.7	49.5	46.8	49.8	48.3	51.2	52.6
1933.....	47.0	50.0	43.0	45.5	51.3	58.1	61.6	63.0	63.2	57.5	58.5	59.0
1934.....	62.2	65.8	63.1	68.9	65.3	63.0	62.2	57.6	53.7	53.4	51.0	55.5
1935.....	63.7	64.3	67.8	63.3	63.3	57.9	59.9	63.8	61.6	65.6	70.1	72.1
1936.....	69.3	62.5	66.4	66.8	69.0	67.6	71.2	70.3	69.3	72.4	73.3	76.1
1937.....	72.4	68.8	74.7	72.7	74.8	68.4	70.9	70.4	68.0	68.3	61.8	56.5
1938.....	52.8	48.0	49.2	48.7	49.3	45.1	50.3	52.9	58.0	61.2	62.3	64.9
1939.....	62.4	59.0	62.2	60.4	58.4	60.0	59.5	65.6	70.0	73.9	76.9	81.0
1940.....	75.3	69.2	69.6	63.8	69.4	70.7	68.8	76.8	75.8	76.5	81.4	87.0
1941.....	84.4	80.3	88.5	84.4	89.7	88.5	90.1	91.7	87.5	91.5	89.5	92.3
1942.....	92.3	86.6	90.4	90.2	91.5	89.7	96.3	96.7	96.4	107.9	112.3	119.7
1943.....	122.7	117.6	128.6	127.1	132.3	130.8	149.0	153.0	164.0	173.3	179.9	179.9
1944.....	178.3	172.5	175.8	170.4	170.2	166.3	172.2	175.0	167.0	164.7	162.7	165.3
1945.....	161.1	155.0	165.8	160.0	166.9	156.3	154.8	140.9	106.2	97.8	93.5	90.2

[a] Series available from 1920 on, but not adjusted for trend before July, 1922, because trend was negative.

INDUSTRIAL AND COMMERCIAL POWER SALES, PITTSBURGH

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925.....	59.0	58.8	57.3	57.9	54.0	59.8	57.7	58.9	61.8	62.0	65.2	64.7
1926.....	66.5	68.9	68.5	69.4	66.0	68.2	65.9	68.0	70.3	69.5	74.0	70.3
1927.....	72.7	73.1	77.3	76.6	70.3	70.6	69.7	75.8	75.3	72.9	72.4	70.4
1928.....	77.1	77.5	81.7	82.3	83.2	84.8	83.4	90.2	89.4	91.8	91.2	84.8
1929.....	89.0	90.0	91.7	94.6	99.7	97.5	97.4	100.2	97.7	99.4	94.2	88.4
1930.....	91.9	90.5	90.3	90.9	91.7	89.9	84.9	84.4	86.7	85.6	76.6	73.5
1931.....	75.7	74.9	78.5	80.3	77.5	73.0	72.4	71.5	68.8	69.0	63.8	61.2
1932.....	61.2	62.5	60.8	61.2	57.6	57.6	56.2	52.7	57.0	57.6	57.7	55.8
1933.....	55.8	52.0	54.6	57.1	66.5	76.8	82.9	82.4	75.0	68.1	67.3	65.8
1934.....	70.0	70.1	79.7	80.4	86.4	82.5	73.7	71.9	67.7	71.8	70.9	74.5
1935.....	81.9	82.0	85.9	84.5	85.4	80.5	79.9	85.7	86.1	93.2	93.1	93.1
1936.....	96.6	94.0	81.7	101.6	103.0	105.5	109.1	108.6	109.3	114.5	110.3	114.4
1937.....	115.6	117.9	127.7	124.0	120.3	121.1	114.7	116.2	113.9	107.2	96.2	87.6
1938.....	82.4	77.0	82.1	78.8	78.3	77.7	78.6	85.8	89.3	93.0	95.7	100.9
1939.....	99.8	97.2	103.0	94.3	94.9	107.6	102.6	114.0	116.8	134.0	138.4	135.3
1940.....	137.8	127.0	124.0	124.9	132.4	131.7	134.2	141.0	137.9	148.7	149.6	153.9
1941.....	166.2	153.6	163.5	158.6	172.3	174.5	175.7	182.6	182.9	189.6	180.0	191.6
1942.....	197.2	181.7	186.1	191.5	186.1	186.2	187.2	192.7	192.8	199.7	197.7	208.0
1943.....	211.6	200.8	218.3	218.9	211.2	215.0	218.3	225.3	226.7	231.6	227.1	242.1
1944.....	224.2	222.2	228.8	223.6	224.6	219.5	212.5	217.9	218.2	219.9	221.1	221.1
1945.....	236.3	220.1	230.7	225.8	228.8	216.8	206.3	194.0	180.2	177.7	181.4	185.2

INDUSTRIAL AND COMMERCIAL POWER SALES, PITTSBURGH
(Adjusted index ÷ trend, 1925–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925.....	174.6	170.5	159.3	155.2	144.3	156.5	153.5	151.2	155.1	153.5	163.3	164.4
1926.....	161.1	164.0	156.9	153.9	146.4	148.3	146.2	146.0	147.9	144.5	155.9	150.9
1927.....	149.1	147.4	150.6	144.7	132.8	131.5	132.5	139.4	136.3	130.8	131.8	130.8
1928.....	137.1	135.6	138.4	135.4	137.2	138.0	138.8	145.6	142.0	144.7	146.1	138.8
1929.....	139.7	139.3	137.4	137.6	145.8	140.9	143.9	143.9	138.3	139.6	134.7	129.4
1930.....	128.9	125.5	121.3	118.8	120.6	116.8	112.9	109.2	110.7	108.6	99.0	97.2
1931.....	96.1	94.0	95.4	95.2	92.5	86.1	87.6	84.2	79.9	79.7	76.4	73.8
1932.....	70.9	71.8	67.6	66.4	62.9	62.2	62.3	57.0	60.7	61.1	62.5	61.9
1933.....	59.5	54.9	56.0	57.1	67.0	76.6	84.8	82.2	73.9	66.8	67.4	67.5
1934.....	69.2	68.6	75.7	74.6	80.6	76.4	70.1	66.6	62.0	65.5	66.0	71.2
1935.....	75.3	74.7	76.1	73.0	74.4	69.5	70.9	74.2	73.7	79.4	81.1	83.2
1936.....	83.1	80.1	67.7	82.2	84.1	85.4	90.6	88.2	87.7	91.6	89.4	96.0
1937.....	93.4	94.5	99.5	94.4	92.4	92.2	89.7	88.8	86.1	80.7	74.2	69.3
1938.....	59.3	58.9	60.7	59.7	58.7	57.9	59.2	62.7	64.1	65.6	68.3	69.2
1939.....	67.9	70.4	72.1	67.6	67.3	75.9	73.3	78.9	79.5	89.6	93.8	88.0
1940.....	89.0	87.2	82.4	85.0	89.1	88.2	91.0	92.7	89.1	94.6	96.3	95.2
1941.....	102.0	100.4	103.4	102.7	110.5	111.3	113.5	114.4	112.7	114.9	110.5	113.1
1942.....	115.4	113.3	112.2	118.3	113.8	113.4	115.4	115.3	113.4	115.5	115.9	117.6
1943.....	118.4	119.6	125.8	129.3	123.6	125.2	128.7	129.0	127.6	128.2	127.4	130.6
1944.....	120.1	126.8	126.3	126.5	125.9	122.4	120.1	119.5	117.7	116.7	118.9	114.4
1945.....	121.4	120.5	122.2	122.6	123.1	116.1	111.9	102.2	93.3	90.6	93.8	92.0

INDUSTRIAL EMPLOYMENT, LOS ANGELES
(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925	65.0	65.3	64.8	64.5	64.8	66.0	67.4	68.5	69.3	69.8	70.3	71.2
1926	72.4	72.9	73.4	72.6	73.4	72.9	73.6	74.1	75.3	76.1	76.1	76.1
1927	76.4	77.1	77.1	76.9	76.4	75.7	74.4	73.0	72.7	72.7	72.6	73.0
1928	74.2	75.7	75.9	75.9	75.9	76.4	77.1	78.7	80.3	81.4	82.4	84.5
1929	86.9	88.5	88.7	89.0	89.0	89.8	90.6	91.4	92.2	91.7	90.1	87.6
1930	86.4	85.2	83.0	80.2	79.2	78.3	77.7	77.5	78.0	78.0	76.4	74.2
1931	72.4	71.9	71.9	71.9	70.8	68.8	67.1	65.7	64.4	62.2	59.6	59.0
1932	58.9	59.3	58.7	58.2	57.8	56.7	56.4	56.4	57.6	57.6	55.7	54.1
1933	53.2	53.4	54.1	55.0	56.6	58.2	60.7	63.6	65.8	66.6	65.6	65.9
1934	67.0	69.7	70.3	71.1	71.4	71.7	72.4	73.9	75.3	75.3	74.2	75.3
1935	75.6	79.8	80.1	79.6	80.0	77.6	79.8	82.6	85.3	87.4	85.5	84.1
1936	83.1	83.9	88.7	88.7	92.5	93.7	96.5	101.8	104.1	106.3	102.7	105.4
1937	104.4	108.8	112.8	111.9	115.0	114.8	115.3	117.0	112.9	112.7	108.8	102.3
1938	100.9	101.3	100.2	99.5	99.0	97.3	96.4	100.9	103.8	103.5	103.5	103.1
1939	99.5	102.6	105.2	107.5	107.8	108.4	108.8	112.1	117.0	119.7	121.0	120.2
1940	119.0	120.6	123.5	124.4	127.1	128.0	126.6	134.1	138.5	144.3	148.7	153.8
1941	154.5	158.7	164.7	173.2	182.3	189.7	200.4	208.2	214.5	227.0	232.2	235.2
1942	235.2	247.7	253.1	260.3	269.3	279.7	292.6	308.3	313.9	326.6	338.2	358.4
1943	367.2	377.9	385.2	390.1	390.4	395.7	403.0	411.7	398.2	399.7	400.6	402.4
1944	398.7	394.1	386.4	380.9	373.8	361.3	359.4	355.0	341.0	337.4	334.1	334.7
1945	332.0	331.5	327.1	317.2	300.4	289.1	281.3	273.1	210.1	200.7	200.4	207.2

INDUSTRIAL EMPLOYMENT, LOS ANGELES
(Unadjusted index ÷ trend, 1925–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1926[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1927	288.3	279.3	269.6	258.9	248.1	237.3	225.5	214.1	206.5	200.8	194.6	190.1
1928	187.8	186.5	182.0	177.8	173.3	170.2	167.6	167.1	166.6	165.4	163.8	164.4
1929	165.5	165.1	162.2	159.8	156.7	155.1	153.6	152.1	150.7	147.2	142.3	136.0
1930	131.9	127.9	122.6	116.6	113.5	110.4	107.9	106.0	105.1	103.6	100.1	95.9
1931	92.2	90.3	89.1	87.9	85.4	82.0	78.9	76.3	73.9	70.4	66.7	65.3
1932	64.4	64.0	62.6	61.4	60.3	58.5	57.6	56.9	57.5	56.9	54.4	52.3
1933	50.9	50.6	50.7	51.0	52.0	52.9	54.7	56.7	58.1	58.3	56.8	56.6
1934	57.0	58.8	58.7	58.9	58.6	58.3	58.4	59.1	59.7	59.2	57.8	58.1
1935	57.9	60.6	60.4	59.5	59.3	57.1	58.2	59.8	61.3	62.3	60.5	59.0
1936	57.9	58.0	60.9	60.4	62.5	62.9	64.3	67.4	68.4	69.3	66.5	67.8
1937	66.7	69.0	71.1	70.0	71.5	70.9	70.7	71.3	68.3	67.8	65.0	60.7
1938	59.5	59.3	58.4	57.6	56.9	55.6	54.7	56.9	58.2	57.7	57.4	56.8
1939	54.5	55.9	56.9	57.9	57.7	57.7	57.5	58.9	61.2	62.2	62.6	61.8
1940	60.8	61.3	62.4	62.5	63.6	63.7	62.6	66.0	67.8	70.3	72.0	74.1
1941	74.1	75.7	78.1	81.7	85.6	88.6	93.2	96.3	98.7	103.9	105.8	105.4
1942	106.1	111.2	113.1	115.7	119.2	123.2	128.3	134.5	136.3	141.1	145.5	153.5
1943	156.5	160.3	162.7	164.0	163.3	164.9	167.2	170.0	163.7	163.5	163.2	163.2
1944	161.0	158.5	154.7	151.8	148.3	142.7	141.4	139.1	133.0	131.1	129.2	128.9
1945	127.4	126.7	124.5	120.2	113.4	108.6	105.3	101.8	78.0	74.2	73.8	76.0

[a] Data available for 1925 and 1926 but not adjusted for trend.

INDUSTRIAL EMPLOYMENT, SAN FRANCISCO
(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925.....	99.4	101.5	103.8	103.8	103.8	99.4	101.5	107.0	108.1	112.5	113.6	113.6
1926.....	104.8	108.1	107.0	108.1	109.2	108.1	105.9	110.3	112.5	113.6	111.3	110.3
1927.....	106.9	109.1	108.0	108.0	108.0	104.7	101.4	103.7	103.7	105.8	105.3	102.6
1928.....	100.7	103.5	105.1	104.1	104.1	104.1	101.8	106.3	110.8	114.1	110.2	110.1
1929.....	107.8	110.8	113.8	112.5	112.5	114.8	117.1	123.0	119.5	123.0	118.5	108.3
1930.....	109.2	112.7	112.7	110.7	108.3	106.2	104.0	109.5	107.3	104.0	100.0	92.6
1931.....	89.8	90.1	91.6	89.5	89.5	90.5	90.5	89.5	85.3	82.0	80.7	78.5
1932.....	73.9	78.1	77.9	75.7	72.3	71.2	72.3	80.1	81.2	75.7	74.1	70.4
1933.....	67.1	71.3	72.0	75.5	77.8	85.9	85.9	91.8	98.7	93.7	85.2	85.6
1934.....	86.1	85.3	90.9	94.2	94.2	94.2	90.5	102.8	97.9	99.0	96.3	92.4
1935.....	87.2	89.7	90.2	94.9	90.0	91.5	99.3	114.8	111.0	99.2	96.4	95.4
1936.....	89.8	91.4	95.0	102.2	100.3	101.9	107.6	125.4	115.7	109.5	103.2	96.0
1937.....	94.1	99.1	108.5	115.1	112.8	111.4	123.6	129.3	123.7	111.2	103.6	99.4
1938.....	93.0	92.4	90.9	87.8	89.8	92.1	90.9	100.7	101.5	92.7	91.8	91.8
1939.....	89.3	90.9	91.4	92.3	92.9	95.1	96.9	103.6	102.0	103.4	98.1	95.1
1940.....	93.1	94.6	95.6	102.0	101.7	104.6	101.6	122.3	118.4	114.2	106.1	109.8
1941.....	108.0	111.2	114.8	116.1	116.9	129.6	149.5	167.9	166.3	166.6	162.2	161.9
1942.....	165.9	173.7	182.3	197.2	209.8	224.0	260.4	289.2	307.4	307.8	308.4	315.3
1943.....	320.0	334.8	338.6	338.6	337.7	347.7	353.1	376.2	369.7	362.1	355.5	345.9
1944.....	338.5	336.6	327.5	321.0	317.7	312.2	316.6	324.9	324.0	314.3	298.0	294.6
1945.....	290.4	287.6	268.3	254.3	242.8	236.4	233.4	232.9	191.4	170.6	106.9	102.1

INDUSTRIAL EMPLOYMENT, SAN FRANCISCO
(Adjusted index ÷ trend, 1925–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1925.....	201.5	198.1	196.8	195.0	192.6	181.3	186.0	181.0	182.5	187.3	192.5	197.1
1926.....	184.1	182.6	175.9	176.5	176.8	171.8	169.4	163.1	166.7	165.8	165.6	168.3
1927.....	165.3	162.5	156.8	155.9	154.8	147.5	143.9	136.4	136.6	137.5	139.7	139.7
1928.....	139.1	137.9	136.0	134.6	133.8	131.7	129.9	125.8	131.4	133.7	131.8	135.5
1929.....	134.5	133.5	134.0	132.0	131.0	131.7	135.6	132.4	128.9	131.2	129.1	121.6
1930.....	124.3	123.9	121.2	118.7	115.4	111.5	110.3	108.0	106.2	101.7	100.0	95.5
1931.....	93.9	91.1	90.6	88.4	87.9	87.6	88.6	81.4	77.9	74.1	74.6	74.7
1932.....	71.6	73.1	71.4	69.3	65.8	63.9	65.7	67.6	68.9	63.5	63.7	62.4
1933.....	60.4	62.2	61.5	64.4	66.0	72.0	72.8	72.3	78.2	73.5	68.5	70.9
1934.....	72.5	69.5	72.7	75.2	74.8	73.9	71.8	75.9	72.7	72.9	72.6	71.9
1935.....	69.9	70.9	70.4	72.4	68.7	69.0	71.3	74.5	73.6	68.9	69.9	69.9
1936.....	67.8	68.2	69.9	73.6	72.2	72.6	72.9	76.9	72.6	71.8	70.7	66.6
1937.....	67.2	69.9	75.4	78.4	76.9	75.1	79.3	75.0	73.5	69.1	67.3	65.4
1938.....	63.0	61.8	60.0	56.8	58.2	59.0	55.4	55.6	57.3	54.8	56.7	57.4
1939.....	57.6	57.9	57.4	56.8	57.3	57.9	56.2	54.4	54.8	58.2	57.7	56.6
1940.....	57.2	57.4	57.2	59.9	59.8	60.8	56.2	61.3	60.8	61.4	59.6	62.5
1941.....	63.4	64.5	65.6	65.2	65.7	72.0	79.2	80.5	81.7	85.6	87.2	88.2
1942.....	93.2	96.4	99.8	106.0	112.9	119.3	132.1	133.0	144.7	151.7	159.0	164.6
1943.....	172.4	178.2	177.9	174.6	174.5	177.7	172.0	166.0	167.0	171.3	176.0	173.5
1944.....	175.1	172.1	165.4	159.1	157.7	153.4	148.2	137.8	140.7	143.1	141.9	142.2
1945.....	144.5	141.5	130.4	121.3	116.0	111.9	105.2	95.1	80.1	74.8	49.0	47.4

INDUSTRIAL EMPLOYMENT, CHICAGO
(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923	128.2	134.4	137.0	138.1	139.5	141.0	142.6	143.2	142.6	143.5	140.2	137.8
1924	135.3	138.2	137.7	134.4	132.1	129.2	124.4	123.5	123.0	123.4	126.8	132.9
1925	133.2	134.9	132.6	130.6	129.0	129.3	128.3	129.5	130.6	135.4	136.4	136.9
1926	134.9	138.2	137.7	137.4	137.7	141.2	141.7	141.8	143.1	142.8	140.5	138.8
1927	137.0	137.8	137.1	136.7	136.2	138.4	134.0	134.1	131.9	133.1	131.3	129.2
1928	125.9	128.3	127.5	126.4	127.8	130.5	127.7	128.9	129.0	130.5	130.0	130.9
1929	128.9	130.5	131.8	132.6	135.6	136.4	136.4	137.8	138.4	136.9	137.1	134.4
1930	132.0	130.6	127.4	123.2	121.9	119.3	114.8	112.6	109.8	107.7	104.9	105.6
1931	104.6	103.8	102.6	100.7	98.6	95.5	92.5	92.7	90.3	87.6	85.1	86.2
1932	83.9	82.6	80.6	76.5	75.7	75.1	69.1	71.8	72.4	72.2	70.1	67.6
1933	66.8	67.3	65.4	66.9	69.2	72.4	76.9	86.9	88.5	89.0	85.4	82.5
1934	82.4	85.6	87.0	88.3	90.6	91.7	91.1	92.0	95.0	93.9	89.3	89.4
1935	89.0	92.5	92.9	93.9	93.5	90.7	87.8	88.5	91.2	92.8	93.4	93.6
1936	93.1	93.8	93.9	94.9	97.2	98.4	99.8	102.9	105.2	106.8	108.8	110.3
1937	110.6	112.8	115.0	115.4	117.3	116.8	117.4	118.2	119.8	117.6	112.5	107.2
1938	101.9	100.6	97.0	94.2	91.6	89.2	87.8	88.7	91.1	93.2	94.5	95.7
1939	94.7	95.4	95.6	94.6	94.8	95.5	96.1	97.7	100.7	106.3	108.8	108.9
1940	106.3	105.8	105.2	103.6	104.3	104.5	106.7	108.7	110.9	113.1	115.9	119.3
1941	118.7	117.6	116.8	124.4	128.1	130.8	135.7	138.1	138.4	139.4	140.2	140.6
1942	139.1	139.0	137.9	137.5	136.5	136.0	138.7	142.3	142.9	145.7	146.4	149.0
1943	149.7	152.5	152.7	151.9	152.8	154.0	155.6	156.5	157.0	159.9	163.1	163.1
1944	162.1	161.8	160.5	157.5	155.5	155.0	154.0	152.6	151.8	152.0	151.4	152.2
1945	150.4	148.9	147.0	143.9	140.7	138.2	132.0	130.2	111.5	111.5	114.6	118.7

INDUSTRIAL EMPLOYMENT, CHICAGO
(Unadjusted index ÷ trend, 1923–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923.....	109.7	115.0	117.2	118.1	119.3	120.6	121.9	122.4	121.9	122.6	119.8	117.8
1924.....	115.6	118.1	117.7	114.9	112.9	110.3	106.2	105.5	105.0	105.4	108.3	113.5
1925.....	113.7	115.2	113.2	111.5	110.2	110.3	109.5	110.5	111.4	115.5	116.4	116.8
1926.....	115.1	117.9	117.5	117.1	117.4	120.4	120.8	120.9	122.0	121.7	119.8	118.3
1927.....	116.8	117.5	116.9	116.5	116.0	117.9	114.1	114.2	112.4	113.4	111.8	110.1
1928.....	107.2	109.3	108.6	107.6	108.8	111.1	108.7	109.7	109.8	111.1	110.6	111.4
1929.....	109.7	111.1	112.2	112.8	115.3	116.0	116.0	117.2	117.7	116.4	116.6	114.3
1930.....	112.2	111.1	108.2	104.7	103.6	101.4	97.5	95.7	93.3	91.5	89.1	89.7
1931.....	88.9	88.2	87.1	85.5	83.7	81.1	78.5	78.7	76.7	74.4	72.2	73.2
1932.....	71.2	70.1	68.4	64.9	64.2	63.7	58.6	60.9	61.4	61.2	59.5	57.3
1933.....	56.6	57.0	55.4	56.7	58.6	61.4	65.2	73.6	75.0	75.4	72.4	69.9
1934.....	69.8	72.5	73.7	74.8	76.7	77.6	77.1	77.9	80.4	79.5	75.6	75.7
1935.....	75.3	78.3	78.6	79.4	79.1	76.7	74.3	74.9	77.2	78.5	79.0	79.1
1936.....	78.7	79.3	79.4	80.2	82.2	83.2	84.4	87.0	88.9	90.3	91.9	93.2
1937.....	93.4	95.3	97.1	97.5	99.1	98.6	99.2	99.8	101.2	99.2	94.9	90.5
1938.....	86.0	84.9	81.9	79.5	77.3	75.3	74.1	74.9	76.9	78.6	79.7	80.7
1939.....	79.8	80.4	80.6	79.8	79.9	80.5	81.0	82.4	84.9	89.6	91.7	91.7
1940.....	89.6	89.1	88.6	87.3	87.9	88.0	89.9	91.6	93.4	95.2	97.6	100.4
1941.....	99.9	99.0	98.3	104.7	107.8	110.1	114.2	116.1	116.4	117.2	117.9	118.3
1942.....	117.0	116.9	116.0	115.6	114.8	114.4	116.7	119.6	120.1	122.4	123.0	125.2
1943.....	125.8	128.2	128.3	127.6	128.4	129.4	130.6	131.4	131.8	134.3	136.9	136.9
1944.....	136.1	135.9	134.8	132.2	130.6	130.1	129.2	128.0	127.3	127.5	127.0	127.7
1945.....	126.2	124.9	123.3	120.7	118.0	115.8	110.6	109.1	93.5	93.5	96.1	99.5

INDUSTRIAL EMPLOYMENT, DETROIT
(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920.....	91.4	93.5	94.7	62.0	89.3	89.8	87.7	86.7	83.0	70.4	64.1	13.7
1921.....	18.5	26.1	38.9	53.6	55.4	52.0	55.9	55.8	54.9	53.1	53.0	24.8
1922.....	53.2	57.5	62.5	72.0	79.3	84.8	87.2	86.7	78.5	83.4	85.3	81.4
1923.....	96.1	101.4	105.1	107.2	108.7	106.1	104.5	104.1	102.4	102.1	101.1	95.1
1924.....	112.6	114.5	114.3	110.1	101.5	95.6	93.9	92.5	93.5	92.7	93.5	45.2
1925.....	98.4	99.4	107.2	112.4	113.5	114.4	115.4	111.9	122.4	126.6	126.5	61.5
1926.....	124.2	128.6	128.2	119.5	116.6	105.8	110.5	113.6	111.4	104.9	98.2	41.4
1927.....	101.9	105.8	107.4	107.7	107.0	89.8	95.6	97.4	93.5	92.8	92.5	88.8
1928.....	106.1	110.8	116.6	120.0	122.9	125.0	129.8	139.4	140.8	135.5	130.3	116.6
1929.....	137.6	141.8	142.9	142.9	137.6	134.7	137.6	133.4	125.0	103.5	97.7	103.0
1930.....	111.9	113.5	114.0	116.1	114.7	104.0	50.4	87.2	78.6	83.0	79.6	42.0
1931.....	80.4	85.3	87.2	87.7	84.5	76.9	64.9	52.5	53.6	43.8	55.4	67.2
1932.....	72.5	72.1	68.7	70.9	73.1	75.9	66.6	30.7	39.3	44.1	41.3	50.4
1933.....	30.3	51.7	43.9	52.5	55.2	63.8	66.0	68.0	62.6	39.2	43.7	64.8
1934.....	87.4	104.1	113.2	118.4	105.6	87.3	88.2	73.8	67.5	52.7	65.6	95.8
1935.....	113.8	115.0	115.8	116.4	107.6	98.4	70.0	75.3	86.9	106.0	113.3	114.3
1936.....	109.1	105.1	106.6	111.2	110.3	108.7	106.1	82.0	88.2	108.2	123.7	132.5
1937.....	132.4	134.0	91.7	136.6	135.6	131.8	87.7	87.8	116.0	131.2	120.9	78.3
1938.....	83.8	78.1	74.1	71.9	61.5	57.7	50.2	59.7	75.8	92.5	102.5	108.1
1939.....	105.9	104.3	102.7	100.9	65.6	91.1	62.5	93.9	112.5	107.6	111.3	117.8
1940.....	110.2	115.5	115.9	114.3	107.8	100.9	67.4	98.1	117.3	126.3	128.2	128.1
1941.....	129.2	128.3	128.7	126.4	130.1	125.7	100.9	121.9	120.8	123.2	125.8	102.3
1942.....	107.9	109.9	116.6	121.6	124.6	133.5	140.3	144.9	150.3	154.3	151.1	157.9
1943.....	168.9	172.4	173.4	174.9	178.5	180.2	182.5	184.4	184.6	186.0	185.8	186.9
1944.....	183.9	184.5	185.0	185.7	184.2	183.1	180.7	179.2	176.8	174.8	168.4	169.2
1945.....	169.7	160.2	164.0	156.9	150.9	141.2	138.3	106.5	84.1	105.3	104.8	108.7

INDUSTRIAL EMPLOYMENT, DETROIT
(Adjusted index ÷ trend, 1920–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1920.....	130.9	124.4	125.3	78.5	111.8	115.6	114.2	116.9	115.9	101.9	92.9	25.9
1921.....	25.6	33.6	49.8	65.6	67.0	64.7	70.3	72.7	74.1	74.4	74.3	45.4
1922.....	71.3	71.7	77.5	85.5	93.0	102.2	106.3	109.5	102.7	113.2	115.8	144.2
1923.....	124.7	122.4	126.1	123.1	123.5	123.9	123.5	127.4	129.8	134.3	133.3	163.5
1924.....	141.8	134.1	133.2	122.7	111.9	108.3	107.5	109.8	114.9	118.3	119.5	75.4
1925.....	120.2	112.9	121.1	121.6	121.4	125.8	128.5	129.0	146.3	157.0	157.2	99.7
1926.....	147.3	141.8	140.7	125.5	121.1	113.1	119.4	127.3	129.4	126.4	118.6	65.3
1927.....	117.6	113.6	114.7	110.2	108.2	93.3	100.4	106.1	105.5	108.7	108.6	136.0
1928.....	119.1	115.6	121.1	119.4	120.9	126.5	132.9	147.8	154.8	154.6	149.0	173.9
1929.....	150.3	144.1	144.5	138.4	131.7	132.7	137.2	137.7	133.9	115.1	108.9	149.8
1930.....	119.1	112.5	112.4	109.6	107.1	99.8	49.0	87.8	82.0	89.9	86.5	59.6
1931.....	83.5	82.4	83.8	80.7	77.0	72.0	61.5	57.6	54.6	46.3	58.7	92.9
1932.....	73.4	67.9	64.4	63.6	65.0	69.3	61.6	29.5	39.0	45.5	42.7	68.1
1933.....	30.0	47.5	40.2	46.0	47.9	56.9	59.5	63.6	60.7	39.5	44.1	85.4
1934.....	75.8	87.8	100.3	101.5	98.9	85.5	111.9	87.5	67.6	46.8	55.0	81.4
1935.....	96.4	94.8	100.2	97.5	98.4	94.2	86.8	87.3	84.9	92.0	92.9	94.9
1936.....	90.4	84.7	90.3	91.1	98.7	101.8	128.7	93.0	84.3	91.8	99.1	107.6
1937.....	107.3	105.6	75.9	109.6	118.7	120.8	104.1	97.4	108.6	109.1	94.9	62.3
1938.....	66.4	60.2	60.0	56.4	52.7	51.8	58.3	64.9	69.4	75.3	78.7	84.2
1939.....	82.2	78.8	81.6	77.5	55.1	80.1	71.1	99.8	100.9	85.8	83.7	89.8
1940.....	83.9	85.5	90.1	86.1	88.7	86.9	75.2	102.3	103.2	98.7	94.5	95.7
1941.....	104.1	103.9	103.2	101.8	103.5	100.7	80.9	97.4	96.6	98.5	101.6	84.0
1942.....	85.1	87.3	91.8	96.1	97.2	105.0	110.3	113.6	117.8	120.9	124.4	127.0
1943.....	130.7	134.3	133.7	135.6	136.6	138.9	140.7	141.8	142.1	143.1	144.5	147.6
1944.....	139.7	140.9	140.0	141.1	138.3	138.5	136.7	135.3	133.5	131.9	128.4	131.2
1945.....	126.5	120.2	121.9	117.1	111.3	104.8	102.8	78.9	62.3	78.0	78.5	82.6

Industrial Employment, Cleveland

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1921	100.7	97.7	97.4	96.6	97.4	85.1	79.5	88.0	88.3	86.6	87.2	83.9
1922	89.8	94.7	96.7	101.3	104.4	109.0	104.0	109.0	107.6	109.8	111.8	113.7
1923	114.1	118.3	121.2	120.7	121.3	118.7	120.6	119.4	118.7	116.3	112.7	113.7
1924	114.1	114.3	118.2	112.2	107.5	103.5	100.0	99.2	101.7	100.9	102.6	101.6
1925	105.9	107.1	109.6	111.2	110.8	109.8	108.9	109.9	110.0	114.1	112.9	113.8
1926	114.8	116.2	117.1	115.8	117.2	116.5	117.9	119.2	119.3	114.1	108.9	109.8
1927	109.9	112.5	115.9	111.7	116.2	114.7	110.0	108.8	105.7	100.9	101.9	100.0
1928	103.9	106.7	108.6	111.3	111.9	111.9	112.1	114.6	115.3	111.4	114.1	115.2
1929	118.7	124.4	124.3	124.0	124.9	124.7	125.1	125.9	124.9	120.1	109.6	106.9
1930	109.9	108.2	107.5	105.2	108.7	104.7	100.1	96.8	92.7	92.2	88.0	88.5
1931	90.4	90.6	90.6	89.4	87.0	84.4	80.8	81.8	76.2	76.6	77.6	77.6
1932	76.4	75.6	72.5	70.7	70.3	69.1	66.5	67.2	65.6	65.5	66.2	67.0
1933	67.0	67.2	62.1	65.6	69.2	74.4	79.2	84.2	83.9	80.2	83.2	82.7
1934	87.5	93.2	94.2	98.7	97.6	96.7	92.1	88.8	85.5	85.1	83.4	87.6
1935	93.6	96.3	97.7	99.0	91.6	90.2	96.4	94.6	100.0	106.5	105.9	105.6
1936	105.8	105.1	105.3	106.0	107.3	107.3	107.5	101.6	107.5	113.7	114.0	113.7
1937	103.7	117.6	118.5	121.1	120.9	114.6	117.4	111.2	114.0	113.0	101.3	99.4
1938	91.3	89.4	85.5	84.2	80.6	80.8	78.1	82.5	85.8	88.5	89.9	91.8
1939	91.2	91.2	91.8	91.7	91.2	90.8	89.5	92.5	100.4	104.0	106.7	105.8
1940	105.5	105.5	106.3	107.3	108.2	108.1	109.0	113.0	115.7	120.2	121.8	122.7
1941	125.3	127.2	130.9	135.7	139.7	143.3	145.1	148.0	149.5	149.7	149.8	145.3
1942	148.7	153.5	155.7	157.2	159.2	162.9	165.6	168.1	169.0	174.2	178.3	183.3
1943	184.5	187.7	190.3	189.4	188.9	191.0	190.7	188.8	186.8	185.8	186.4	183.0
1944	181.9	181.6	180.1	178.1	177.2	178.8	178.8	176.8	174.7	173.7	174.4	176.5
1945	178.2	179.4	177.0	174.9	171.8	170.9	167.8	137.1	133.5	134.6	136.0	136.4

INDUSTRIAL EMPLOYMENT, CLEVELAND
(Unadjusted index ÷ trend, 1921–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1921.....	116.8	113.1	112.5	111.4	112.1	97.7	91.1	100.6	100.7	98.5	99.1	95.1
1922.....	101.6	106.9	108.9	113.8	117.0	122.1	116.2	121.5	119.7	121.9	123.8	125.6
1923.....	125.9	130.3	133.2	132.3	132.7	129.6	131.5	129.9	128.9	126.0	121.8	122.7
1924.....	122.8	122.9	126.8	120.1	114.9	110.3	106.4	105.3	107.8	106.8	108.3	107.1
1925.....	111.4	112.4	114.8	116.3	115.7	114.4	113.2	114.0	113.9	118.0	116.5	117.2
1926.....	118.0	119.2	119.9	118.3	119.6	118.6	119.8	120.9	120.7	115.3	109.8	110.6
1927.....	110.5	112.8	116.0	111.6	115.9	114.1	109.3	107.9	104.7	99.7	100.5	98.4
1928.....	102.2	104.7	106.4	108.8	109.2	109.0	108.9	111.3	111.7	107.7	110.1	111.0
1929.....	114.1	119.4	119.2	118.7	119.3	118.9	119.0	119.6	118.4	113.7	103.6	100.8
1930.....	103.5	101.7	100.8	98.6	101.7	97.8	93.3	90.0	86.1	85.4	81.5	81.8
1931.....	83.4	83.4	83.3	82.0	79.7	77.2	73.8	74.6	69.3	69.6	70.4	70.2
1932.....	69.1	68.2	65.3	63.6	63.1	61.9	59.5	60.1	58.5	58.3	58.8	59.4
1933.....	59.3	59.5	54.9	57.8	60.9	65.4	69.5	73.7	73.4	70.0	72.6	72.0
1934.....	76.0	80.8	81.6	85.4	84.3	83.4	79.3	76.3	73.3	72.9	71.3	74.8
1935.....	79.8	82.0	83.0	84.0	77.6	76.3	81.4	79.8	84.1	89.5	88.8	88.5
1936.....	88.5	87.8	87.8	88.3	89.2	89.0	89.1	84.1	88.8	93.8	93.9	93.5
1937.....	85.1	96.5	97.1	99.0	98.7	93.4	95.5	90.4	92.5	91.6	82.0	80.3
1938.....	73.6	72.0	68.8	67.6	64.6	64.7	62.4	65.8	68.4	70.5	71.5	72.9
1939.....	72.3	72.2	72.5	72.3	71.9	71.4	70.3	72.5	78.6	81.3	83.4	82.5
1940.....	82.2	82.0	82.5	83.2	83.7	83.6	84.2	87.1	89.1	92.4	93.5	94.0
1941.....	95.9	97.2	99.9	103.4	106.3	108.9	110.1	112.2	113.2	113.2	113.1	109.5
1942.....	111.9	115.4	116.9	117.8	119.2	121.7	123.6	125.3	125.8	129.5	132.4	135.9
1943.....	136.6	138.7	140.4	139.7	139.1	140.4	140.0	138.4	136.7	135.8	136.2	133.5
1944.....	132.5	132.1	130.8	129.2	128.4	129.4	129.2	127.6	125.9	125.0	125.3	126.7
1945.....	127.7	128.4	126.5	124.8	122.5	121.6	119.3	97.4	94.7	95.3	96.2	96.3

INDUSTRIAL EMPLOYMENT, PITTSBURGH

(Unadjusted index, 1935–1939 = 100)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923	114.6	118.4	119.3	119.9	122.7	123.3	126.5	129.4	130.7	135.6	123.3	121.8
1924	118.3	117.1	115.8	114.6	110.9	108.2	104.9	103.4	98.9	102.8	104.8	106.7
1925	109.0	109.2	109.3	108.1	107.5	106.7	106.5	109.3	108.4	110.1	110.2	112.7
1926	113.0	114.4	116.1	116.5	116.3	116.6	118.2	118.7	117.5	117.9	116.0	114.6
1927	113.0	112.5	111.2	108.5	107.1	107.1	106.8	107.2	107.2	105.1	103.2	100.7
1928	99.2	99.5	98.9	99.0	99.1	99.7	101.1	101.8	101.1	101.8	102.7	104.3
1929	105.4	106.3	108.6	111.0	112.1	113.5	114.0	114.3	113.1	113.0	108.9	104.7
1930	103.9	102.7	102.9	102.9	102.4	102.2	100.3	97.5	95.7	94.0	91.4	88.3
1931	87.9	86.8	86.3	85.3	84.8	81.3	79.4	78.1	79.1	77.5	75.3	73.4
1932	72.0	70.5	70.4	70.4	69.3	68.2	66.3	65.5	66.9	68.0	68.7	66.8
1933	65.4	65.7	64.2	66.6	70.7	76.2	80.1	85.3	87.2	87.5	85.3	83.0
1934	81.8	84.9	86.9	89.0	91.6	92.9	90.6	89.3	86.1	86.0	85.5	84.2
1935	85.3	87.3	88.3	88.3	88.2	88.0	88.4	89.1	90.4	92.7	92.9	91.8
1936	90.5	92.4	94.3	99.4	101.6	102.9	106.8	107.5	108.6	109.4	105.9	107.5
1937	108.9	112.3	116.5	120.5	121.6	122.0	123.1	121.5	121.9	118.2	109.4	102.7
1938	96.0	94.0	94.3	92.2	89.7	85.9	86.2	88.0	89.7	92.7	93.4	93.9
1939	92.5	94.0	95.0	95.8	94.3	95.2	94.6	96.7	100.0	112.1	118.1	119.7
1940	115.4	113.1	110.4	107.4	107.1	111.1	112.9	114.9	116.4	119.5	121.6	124.3
1941	125.3	127.0	128.0	132.2	134.6	138.8	142.7	145.1	145.6	146.2	146.2	147.5
1942	146.3	147.5	147.2	148.1	147.9	148.4	147.9	148.8	149.3	151.6	151.8	153.7
1943	154.4	157.0	158.0	159.3	160.2	162.9	163.5	163.7	162.7	163.1	163.8	164.0
1944	162.7	162.9	162.7	162.1	161.7	162.7	162.4	161.7	159.5	159.1	158.1	157.6
1945	157.0	156.1	154.2	150.8	145.3	144.6	141.2	138.0	123.9	122.9	124.6	129.2

INDUSTRIAL EMPLOYMENT, PITTSBURGH
(Unadjusted index ÷ trend, 1923–1945)

Year	January	February	March	April	May	June	July	August	September	October	November	December
1923.....	127.2	131.1	132.0	132.3	135.1	135.6	138.9	141.9	143.0	148.2	134.5	132.7
1924.....	128.6	127.1	125.5	124.0	119.8	116.7	112.9	111.2	106.1	110.2	112.1	114.0
1925.....	116.2	116.3	116.2	114.8	113.9	112.9	112.5	115.2	114.1	115.7	115.6	118.0
1926.....	118.2	119.4	121.1	121.2	120.9	121.0	122.5	122.8	121.4	121.5	119.5	117.8
1927.....	116.0	115.3	113.8	110.8	109.3	109.1	108.6	108.8	108.7	106.4	104.3	101.6
1928.....	99.9	100.1	99.3	99.3	99.2	99.7	100.9	101.5	100.6	101.2	101.9	103.4
1929.....	104.3	105.0	107.1	109.4	110.2	111.5	111.8	111.9	110.6	110.4	106.1	101.9
1930.....	101.0	99.7	99.7	99.5	98.9	98.6	96.6	93.8	91.9	90.1	87.5	84.4
1931.....	84.0	82.7	82.2	81.1	80.5	77.1	75.2	73.8	74.7	73.0	70.9	69.0
1932.....	67.6	66.1	65.9	65.8	64.7	63.6	61.7	60.9	62.1	63.0	63.6	61.7
1933.....	60.3	60.6	59.1	61.2	64.9	69.8	73.3	78.0	79.6	79.8	77.6	75.5
1934.....	74.2	77.0	78.6	80.5	82.7	83.8	81.5	80.3	77.3	77.1	76.5	75.2
1935.....	76.2	77.8	78.6	78.5	78.3	78.0	78.3	78.8	79.8	81.7	81.8	80.7
1936.....	79.5	81.1	82.6	87.0	88.7	89.8	93.0	93.6	94.4	95.0	91.8	93.1
1937.....	94.2	97.0	100.4	103.8	104.6	104.8	105.6	104.1	104.3	101.0	93.3	87.6
1938.....	81.7	79.9	80.1	78.2	76.0	72.7	72.8	74.3	75.6	78.0	78.5	78.8
1939.....	77.5	78.7	79.4	80.0	78.6	79.3	78.7	80.3	82.9	92.9	97.8	98.9
1940.....	95.3	93.2	90.9	88.3	88.0	91.1	92.5	94.0	95.2	97.6	99.2	101.2
1941.....	102.0	103.2	103.9	107.1	109.0	112.2	115.3	117.0	117.3	117.6	117.4	118.4
1942.....	117.2	118.1	117.7	118.3	117.9	118.2	117.7	118.3	118.5	120.2	120.2	121.6
1943.....	122.0	123.9	124.5	125.4	125.9	128.0	128.2	128.3	127.3	127.5	127.9	127.9
1944.....	126.7	126.7	126.4	125.8	125.3	125.9	125.6	124.9	123.1	122.6	121.7	121.1
1945.....	120.6	119.7	118.2	115.4	111.1	110.4	107.7	105.1	94.3	93.4	94.6	98.0

APPENDIX III

The Five Largest Industrial Classifications in 1939 in Six Areas; Number of Wage Earners and Per Cent of Total Manufacturing Wage Earners in 1929 and 1933

THE FIVE LARGEST INDUSTRIAL CLASSIFICATIONS IN 1939 IN SIX AREAS, FOR 1933

Classification	Number of wage earners	Per cent of total manufacturing
LOS ANGELES		
Aircraft and parts, including aircraft engines	.....	....
Bread and other bakery products	5,321	9.2
Furniture, including store and office fixtures	3,225	5.5
Petroleum refining	3,370	5.8
Rubber tires and inner tubes	3,145	5.4
Total[a]	15,061	26.0
Total manufacturing	57,880	
SAN FRANCISCO		
Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles and sauces	6,478	14.5
Petroleum refining	3,193	7.2
Steel-works and rolling-mill products	.....	....
Bread and other bakery products	3,441	7.7
Ship and boat building, steel and wooden, including repair work	1,622	3.6
Total[a]	14,734	33.1
Total manufacturing	44,555	
CHICAGO		
Steel-works and rolling-mill products	31,346	11.0
Electrical machinery, apparatus, and supplies	12,814	4.5
Meatpacking, wholesale	19,599	6.9
Printing and publishing, book, music, and job	14,604	5.1
Bread and other bakery products	12,274	4.3
Total[a]	90,637	31.9
Total manufacturing	284,044	
DETROIT		
Motor-vehicle bodies and motor-vehicle parts	66,392	40.8
Bread and other bakery products	4,725	2.9
Nonferrous metal alloys; nonferrous metal products, except aluminum, not elsewhere classified	4,198	2.6
Machine-tool accessories and machinists' precision tools	3,740	2.3
Machine-shop products	.....	....
Total[a]	79,055	48.6
Total manufacturing	162,588	
CLEVELAND		
Steel-works and rooling-mill products	14,897	16.1
Motor-vehicle bodies and motor-vehicle parts	7,850	8.5
Electrical machinery, apparatus, and supplies	6,058	6.6
Clothing, men's, youths', boys', not elsewhere classified, regular factories	4,582	5.0
Nonferrous metal alloys; nonferrous metal products, except aluminum, not elsewhere classified	2,101	2.3
Total[a]	35,488	38.4
Total manufacturing	92,382	
PITTSBURGH		
Steel-works and rolling-mill products	56,785	47.0
Glass	8,130	6.7
Bread and other bakery products	4,826	4.0
Machine-shop products	.....	....
Structural and ornamental metalwork, made in plants not operated in connection with rolling mills	3,616	3.0
Total[a]	73,357	60.7
Total manufacturing	120,861	

SOURCE: Derived from data in *United States Census of Manufactures.*
[a] Discrepancies owing to rounding.

APPENDIX IV

Seasonal Indexes in Four Series

Seasonal Indexes, Bank Debits

Area	Seasonal period	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Los Angeles	1919–29	106.6	96.2	112.8[b]	100.8	98.2	98.6	97.5	92.4[a]	93.3	99.9	97.4	106.3
	1930–45	105.0	100.8	102.1	101.2	97.8	100.5	100.9	96.1	93.6	99.4	93.3[a]	109.3[b]
San Francisco	1919–38	101.1	92.5[a]	108.4	99.0	95.2	100.2	98.8	97.3	98.1	104.4	96.4	108.6[b]
	1939–45	99.9	92.1	107.1	95.7	90.2[a]	97.6	99.2	97.9	101.8	104.5	100.2	113.7[b]
Chicago	1919–29	104.9	89.5[a]	107.2	99.2	100.1	101.2	99.1	95.5	95.5	103.5	96.2	108.2[b]
	1930–39	97.0	84.4[a]	107.6	101.2	97.6	108.2	101.5	97.1	97.9	102.2	92.3	113.0[b]
	1940–45	99.7	85.9[a]	113.1	97.9	96.8	102.7	97.3	92.5	97.3	105.9	96.1	114.9[b]
Detroit	1919–29	100.2	85.9[a]	101.6	100.6	101.6	104.4[b]	102.9	100.0	101.2	103.3	94.4	104.0
	1930–45	106.1	89.1[a]	105.8	100.6	100.7	104.4	98.7	94.9	93.3	97.7	93.7	115.2[b]
Cleveland	1919–29	107.3	86.2[a]	96.1	104.9	94.1	102.6	104.2	94.1	96.5	106.2	94.2	113.7[b]
	1930–39	103.2	83.3[a]	96.5	99.5	97.4	101.7	104.9	97.2	99.4	107.8	94.8	114.4[b]
	1940–45	97.9	82.8[a]	96.3	98.5	99.6	106.6	102.1	94.9	101.1	105.1	95.6	119.5[b]
Pittsburgh	1919–29	103.8	94.8	101.8	100.3	97.6	103.5	102.2	92.1[a]	92.5	105.3	97.0	109.0[b]
	1930–38	101.0	88.6[a]	94.0	99.7	101.5	108.4	103.3	95.1	93.7	102.7	94.1	118.0[b]
	1939–45	101.3	88.2[a]	99.4	96.1	94.6	106.3	98.8	91.5	102.3	100.0	95.8	125.8[b]
United States	1919–27	105.3	90.1[a]	104.5	98.6	96.6	101.3	99.7	93.4	96.3	106.4	98.0	109.8[b]
	1928–37	102.5	88.1[a]	101.5	100.1	99.1	103.1	101.6	95.2	96.0	106.7	96.1	109.9[b]
	1938–45	101.6	88.5[a]	103.9	96.9	98.1	103.2	98.3	94.4	97.8	103.1	98.2	116.1[b]

[a] Trough month.
[b] Peak month.

SEASONAL INDEXES, DEPARTMENT STORE SALES

Area	Seasonal period	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Los Angeles	1919–29	95.5	92.1	96.8	96.5	94.6	88.6	83.7[a]	96.7	93.3	99.1	104.1	158.9[b]
	1930–39	83.2[a]	88.0	95.1	95.8	94.6	90.4	86.3	95.2	102.0	102.4	102.1	165.0[b]
	1940–45	88.8	90.8	95.1	94.0	92.9	87.6	83.8[a]	91.9	100.3	100.6	114.2	160.0[b]
San Francisco	1919–28	86.0	85.6	91.0	95.5	107.4	88.4	78.7[a]	91.8	95.1	105.0	106.7	168.9[b]
	1929–39	81.8[a]	85.0	91.0	94.4	95.6	88.6	82.0	98.0	98.6	99.7	107.1	178.2[b]
	1940–45	82.5	86.2	96.1	92.2	90.8	90.1	85.2[a]	93.2	98.9	101.2	121.1	162.5[b]
Chicago	1923–29	85.2	83.2	88.5	99.3	98.2	99.5	72.0[a]	74.8	98.5	109.4	117.4	174.1[b]
	1930–39	80.6	83.3	92.0	100.8	103.1	99.8	72.3[a]	81.4	102.3	106.6	110.7	167.1[b]
	1940–45	83.5	85.2	94.7	97.3	96.2	95.3	73.7[a]	82.9	101.0	105.0	119.7	165.4[b]
Detroit	1923–29	76.3	90.1	92.0	104.4	102.4	95.4	68.5[a]	80.8	122.4	102.9	110.0	154.8[b]
	1930–39	73.0	81.1	91.4	105.6	107.1	95.7	69.1[a]	75.2	129.5	97.9	108.7	165.5[b]
	1940–45	77.5	85.4	95.9	98.6	94.9	91.4	76.6[a]	84.5	112.4	108.6	123.7	150.6[b]
Cleveland	1919–27	83.5	80.9	93.0	109.8	99.8	94.6	74.3[a]	85.5	101.7	108.4	113.8	154.5[b]
	1928–39	81.6	75.6[a]	91.9	115.5	97.1	92.2	76.8	85.2	117.3	101.5	103.8	161.6[b]
	1940–45	80.5	79.1	96.6	104.5	92.9	91.1	77.4[a]	89.5	110.8	103.2	119.1	155.4[b]
Pittsburgh	1920–28	87.7	89.5	92.8	102.9	109.3	103.2	73.8[a]	76.1	90.5	106.8	110.9	156.6[b]
	1929–39	72.2	89.0	88.8	105.5	112.3	105.5	68.6[a]	81.3	97.0	108.3	107.0	164.5[b]
	1940–45	76.5	88.8	95.2	99.1	102.3	95.3	68.4[a]	87.5	101.7	106.7	121.2	157.3[b]

[a] Trough month.
[b] Peak month.

SEASONAL INDEXES, INDUSTRIAL AND COMMERCIAL POWER SALES

Area	Seasonal period	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Los Angeles	1927–34	87.8	87.2[a]	91.5	99.6	101.4	105.8	109.7	112.1[b]	107.4	106.7	99.0	91.8
	1935–45	93.8	93.0[a]	93.3	96.1	99.4	101.5	104.3	107.3[b]	106.8	104.7	102.2	97.5
San Francisco	1921–45	114.4[b]	105.9	100.8	99.8	95.6	93.4	91.2[a]	92.6	96.5	97.4	104.1	108.4
Chicago	1920–28	90.6	90.3[a]	92.8	95.0	99.9	106.8	109.4	111.9[b]	108.6	104.0	96.2	94.5
	1929–37	94.4[a]	95.0	95.1	96.8	100.5	103.3	106.6	107.7[b]	105.6	102.9	96.5	95.7
	1938–45	98.7	97.7	98.7	97.4[a]	98.0	100.2	101.6	105.3[b]	101.4	100.8	99.9	100.4
Detroit	1920–30	95.1	95.1	103.3	103.6	104.9	104.6	101.1	109.4[b]	103.7	101.7	91.9	85.5[a]
	1931–38	104.4	104.1	103.2	107.3	109.0[b]	103.0	96.2	86.0[a]	94.5	92.1	97.9	102.4
	1939–45	106.7[b]	104.3	100.2	97.9	97.7	96.7	93.5[a]	94.7	100.7	99.7	105.9	102.0
Cleveland	1920–45	96.1[a]	98.3	102.2	100.7	101.5	99.0	97.4	100.6	98.9	104.3[b]	100.6	100.4
Pittsburgh	1925–37	98.5	98.8	101.1	103.0[b]	101.6	101.9	98.7	100.6	101.2	101.0	98.3	95.3[a]
	1938–45	104.3[b]	97.6	100.5	97.7	98.3	98.4	96.8[a]	99.4	100.7	102.0	100.3	103.9

[a] Trough month.
[b] Peak month.

SEASONAL INDEXES, INDUSTRIAL EMPLOYMENT

Area	Seasonal period	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
San Francisco	1925–34	95.4[a]	98.0	99.5	99.1	99.0	99.7	98.0	104.8[b]	103.7	104.1	101.1	97.5
	1935–45	94.1[a]	94.9	95.8	97.3	96.8	97.5	102.0	112.2[b]	109.2	103.9	99.0	97.4
Detroit	1920–33	97.7	104.8	105.1	109.5	110.5[b]	107.2	105.7	101.8	98.0	94.2	93.8	71.7[a]
	1934–40	108.8	111.7[b]	106.1	109.4	100.0	95.4	73.5[a]	78.5	92.9	104.4	110.4	108.8
	1941–45	100.8	100.0	100.8	100.2	101.3[b]	100.4	100.2	100.3	100.1	100.0	98.8	97.1[a]

[a] Trough month.
[b] Peak month.

APPENDIX V

Indexes of Cyclical Movements in Selected National Series, 1929–1937

INDEXES OF CYCLICAL MOVEMENTS IN SELECTED NATIONAL SERIES, 1929–1937

(1929 = 100)

	1929	1930	1931	1932	1933	1934	1935	1936	1937
National income[a]	100.0	88.6	69.2	49.2	48.4	56.8	62.4	72.1	80.8
National income per capita[b] ($716 = 100.0)	100.0	90.6	77.9	62.2	63.0	68.6	71.9	81.6	87.3
Employment[c]	100.0	96.2	88.7	80.8	81.0	86.5	89.0	93.5	96.6
Unemployment[d]	100.0	725.0	1,750.0	2,750.0	2,950.0	2,450.0	2,250.0	1,850.0	1,600.0
Consumer outlay[a]	100.0	94.7	78.0	61.0	59.3	67.5	69.6	74.5	83.0
Individual saving[e]	100.0	65.9	61.4	29.6	23.9	37.5	46.6	69.3	76.1
Corporate saving[e] (billions of dollars)	1.2	−3.9	−5.8	−6.4	−2.8	−2.1	−1.3	−0.9	−0.8
Capital formation[f] (billions of dollars)	10.0	4.2	0.1	−4.2	−3.6	−2.6	0.7	5.4	6.4
Personal taxes[c]	100.0	86.7	80.0	63.3	60.0	63.3	76.7	96.7	103.3
Manufacturing physical output[g]	100.0	85.4	72.0	54.1	62.6	69.2	82.7	97.0	103.3
Physical output: mining[h]	100.0	88.2	73.5	59.1	64.0	69.7	75.3	88.4	99.5
Physical output: agriculture[i]	100.0	100.7	104.2	100.0	97.2	83.3	92.4	93.1	106.2
New construction[j]	100.0	79.4	60.2	34.1	23.4	28.7	32.5	47.5	53.7
Wholesale prices[k]	100.0	90.7	76.6	68.0	69.2	78.6	83.9	84.8	90.6
Cost of living[k]	100.0	97.5	88.7	79.7	75.4	78.1	80.1	80.9	83.8
Marriages per 1,000 population[l] (10.1 per 1,000 = 100.0)	100.0	91.1	85.1	78.2	86.1	102.0	103.0	105.9	110.9
Divorces per 1,000[l] (1.66 per 1,000 = 100)	100.0	94.0	89.2	77.7	78.9	97.0	103.0	110.8	116.3
Birth rate per 1,000[m] (18.9 per 1,000 = 100)	100.0	100.0	95.2	92.1	87.8	91.0	89.4	88.4	90.5

[a] S. Kuznets, *National Income and Its Composition 1919–1938*, Vol. 1 (New York, N.B.E.R., 1941), table 1; [b] Kuznets, *op. cit.*, table ix; [c] National Industrial Conference Board, *The Economic Almanac* (New York, 1946), pp. 34–35; [d] N.I.C.B., *op. cit.*, pp. 38–39; [e] N.I.C.B., *op. cit.*, p. 70; [f] Kuznets, *op. cit.*, table xxxvii; [g] S. Fabricant, *The Output of Manufacturing Industries, 1899–1937* (New York, N.B.E.R., 1940), p. 44; [h] H. Barger and S. H. Schurr, *The Mining Industries, 1899–1939* (New York, N.B.E.R., 1944), p. 14; [i] H. Barger and H. H. Landsberg, *American Agriculture, 1899–1939* (New York, N.B.E.R., 1942), p. 21; [j] N.I.C.B., *op. cit.*, p. 274; [k] Kuznets, *op. cit.*, table iii; [l] N.I.C.B., *op. cit.*, p. 18; [m] N.I.C.B., *op. cit.*, p. 4.

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